# Pests

AND THEIR CONTROL

1943

DECEMBER

VOL. 11 NO. 12

ORGAN OF THE PEST CONTROL INDUSTRY

Exterminators
Fumigators
Termite Control Operators
Entomologists
Insecticide and Supply Mfgrs.

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# Pests

**and Their CONTROL**

*Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers*

COOPERATING WITH NATIONAL PEST CONTROL ASSOCIATION

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**3019 Fort Hamilton Parkway** **Brooklyn, New York**

## CONTENTS

*"Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of literary material pertaining to pest control and pests from any person interested in the advancement of the field."*


**Editorial** ..... 4-5

**Purdue Pest Control Operators' Conference, Purdue University, Lafayette, Ind., January 17, 18, 19, 20, 1944** ..... 7

**Entomological Literature** ..... 7

**Evaluation of Organization and Measures for Rat Control** ..... 8
By F. E. Garlough

**Recent Developments in Roach Control** ..... 12
By George E. Gould

**RAT CONTROL: A City Administration's Point of View** ..... 14
By Frieda Schicht

**Fourth Annual Eastern Pest Control Operators Conference, January 10, 11, 12, 1944** ..... 16

**Pest Control and the War Effort** ..... 18
By Prof. J. J. Davis

**Cryolite** ..... 19
By J. O. Brunton

**"War on Mosquitos"** ..... 21
By Dr. Lyle D. Goodhue

**Local Organization News** ..... 26

**What's New in Pest Control—Personals** ..... 27

**Write for These Booklets** ..... 30



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# EDITORIAL

## "Confidential Service . . . No Signs on Cars' " Editorial Draws Comment

SEPTEMBER-PESTS carried an editorial advocating the elimination of such phrases as "Confidential Service . . . No Signs on Cars" from classified telephone directory or other advertising. Following exchange of viewpoints between two well-informed members of the industry, apropos this editorial, sheds added light on a moot question for the PCO:

"I have read with a great deal of interest the editorial "Confidential Service . . . No Signs on Cars" in the September issue of the magazine "Pests".

"Most of us have probably made such mistakes in the early days of our career, and our experience as well as such educational articles as this editorial are teaching us to correct our errors. To substantiate your thoughts and your statement that "one thing and only one is necessary: a better enlightened public," I want to assure you that we have followed this principle successfully for a good many years. As a matter of fact, our trucks carry a very prominent display, such as "Pest Control," and, while we heard objections to this in the beginning from some timid people, It is now rarely that anybody ever brings up the question when calling us in for service, and, what is more and what perhaps could have been brought into your article, is the fact that the reference to pest control service under our name on our trucks has been one of our most **powerful advertising tools.** I know very definitely that this has helped us more than anything else to become so widely known in our territory.

"There is one thought that occurred to me in reading the paragraph where you refer to the needlessness of a doctor to assure his patients that their confidence will not be betrayed, and that is the habit of some firms, especially in New York, to advertise in the classified telephone directories a **list of their** more prominent clients. It is one thing to have such a list available for the purpose of giving references in connection with individual proposals, but I have often wondered at the advisability of publicly advertising such a list of names, and I am also wondering what your reaction is to this phase of advertising.

"In conclusion, I feel that this article is another indirect contribution to the raising of the standard of ethics in our industry."

---

"I feel guilty in not having replied to your letter much sooner and I am referring to yours of September 28, which you wrote concerning "Confidential Service . . . No Signs on Cars."

"Frankly, I think there are more or less two schools of thought relative to displaying the idea of "pest control" on automobiles and realize that in instances like yourself, as well as several others, there is tremendous enthusiasm to advertise their businesses on their trucks. On the other hand, there is the school of thought that feels that people do not like to have a car pull up to the door, advertising "pest control" and, for the most part, I must admit that we seem to run into that type of case more as far as our clients are concerned.

"Personally, I do not think it is good policy to advertise in Classified Telephone Directories or even provide a long list of names on the regular letterhead of one's satisfied customers but certainly such list should be available as, if, and when there are prospective clients who would like to have information as to a list of satisfied customers when we are requested to give evidence of our ability to render proper services. The thing that amuses me in the publication of most of the lists I have observed in Classified Telephone Directory advertisements is that certain prominent names appear and, in the last analysis, the same accounts are served as well by others so that it would appear that the element of real strength does not lie in having such list in a form that undoubtedly changes between the time the issues of the Classified Telephone Directories are published as well as changing one's own letterhead. The second abuse I have observed with regard to these lists is that names in reality represent, in part, clients who became dissatisfied and actually changed from the firm that was publicizing its name because of unsatisfactory services.

"I am a little more conservative on some of these matters than perhaps others are, but here again I feel there should be a well chosen portfolio that might be shown to prospective clients, and even an up-to-date list to which reference can be made and in part supply such letters or names that in reality involve accounts being served at the time that the letter is being written. I know of at least one firm in the midwest that keeps a splendid file of reference letters that are used from time to time to meet given situations and if such plan is followed, I would say that a list of satisfied customers means something that is far superior than publicizing by way of the Classified Telephone Directory any such list."

---

## Re: Paid Inspections

I READ D. S. Rennie's recent reiteration of some excellent principles of pest control. The principles Mr. Rennie wrote of bear repeating and more repeating, but I believe the repetition should be ever more detailed so that we can draw ever closer to a realization of an effective program to achieve the desired results.

Mr. Rennie covers three primary objectives in our desire to reach the ultimate goal of intelligent and respected pest control service. The three I refer to are paid inspections, de-emphasis of low bids, and respect for good work. Each one of these objectives is a subject for much discussion, but I'd like to add some lines to clarify the "paid inspection" objective.

First of all, would it be jumping from the frying pan into the fire if we blanket all inspection into the paid group. What will we offer for a paid inspection? The answer to that as stated by others, is a standardized report. But will the report be something worth buying? Looking at it from the client's angle, I'd be willing to pay for a termite report. I don't know just where the trouble is and how it can be stopped. I'd pay for a detailed report telling me where the infestation is and what must be done to eliminate the condition. I could use that report to appraise estimates for the job. On the other hand, I know my home is infested with roaches, I want a pest control operator to get rid of them. I don't need any written report and wouldn't be in the market for any no matter what pretty diagram or fancy words were used.

Working with any groups of things or persons there are always some which fall definitely on one side and others definitely on the opposite side, while a certain proportion lie in a transition zone.

Here's a start on delimiting the lines of yes, no, or maybe for paid inspections:

IN THE "YES" GROUP

A. Where some diagnosis or analysis is a definite requirement to treatment.

1. Definitely termite work; the public should be educated to shop for estimates if they like, but shop with a specific report in hand.
2. Unusually severe or unusual problems such as fly problems, mosquito, squirrel, bat, pigeon, etc.
3. Rat proofing jobs.
4. Mystery problems; where the client doesn't know what's bothering him—the advice and counsel given even if of a negative nature is worth a fee.

IN THE "NO" GROUP

A. Where diagnosis is obvious and cost estimate only necessary.

1. Normal pest problems where the client is aware of the exact nature of the problem and

requires an estimate of the cost of elimination.

IN THE "MAYBE" GROUP

Would include some of the "NO" group depending on the degree of diagnosis necessary, size of problem involved, expense necessary in making survey.

To summarize: This pest control operator's opinion is definitely in favor of "paid inspections" with the reservation that we must remember that we are public servants and therefore, we are honor-bound to request payments for inspections or estimates only where some concrete service is offered in return.

Arthur Louis Brody, Ph.D.
Pioneer Exterminating Co., Inc.
New York City.

## Secretary Buettner Acknowledges a Tribute

IN APPRECIATION for the leadership with which he has endowed the Industry and for his selfless devotion to its best interests, members of the NPCA and the Industry at large presented Sec'y. William O. Buettner with a sizable War Bond purse, during the banquet at the War Emergency Meeting in St. Louis.

If this tribute seems belated to some it is so only because all previous attempts of the description had been sabotaged by the secretary himself. However, a camouflaged approach this time proved successful.

Visibly moved by this banquet demonstration of his esteem, Bill, for the first time in memory of man, was at a loss for words. Had he been able to respond he doubtlessly would have said what he subsequently did in Service Letter No. 308:

"Finally, I come to a few comments which will be difficult to express because there are mingled feelings of appreciation and embarrassment. It was obvious that some kind of 'ganging up' was going on behind the scenes but it was difficult to place a strong finger of protest to put a stop to what by hook, crook or otherwise many friends decided could not be thwarted.

"Graciously, Helen and I expressed appreciation for almost $2,000.00 of War Bonds that were received, the excuse being the arrival of young Ted. Comes the Annual Banquet at the War Emergency Meeting when with sincere feeling and kind expressions there is presented a "fragile" envelope the contents of which represented an investment of War Bonds having a maturity value of $7,770.00. All of these expressions are overwhelming and sufficient to make any person break down. Appreciated!—of course; thankful!—of course; but at the same time embarrassing when I think of much work, time and money expended by many members of our Association. Only teamwork makes for strength of any group and if it were not for the support given by several members in particular and confidence shown by the rank and file, our Association and industry could make no progress. Such is the spirit that makes our Association what it is.

"Every person has a 'hobby', and for my part it is a pleasure to give time and a portion of my energies, to the end that a much needed and essential pest control industry take its place in that larger field of human usefulness, eventually to be recognized as being entitled to a professional status, serving mankind in the destruction of insects and rodents that cause health hazards, even sickness and death, as well as destroying food, other commodities and our very homes. Pest Control is a challenge and I enjoy being a part of our industry.

"One cannot take money with him when he passes on and therefore the only excuse for accepting the generous gift will be for the purpose of making available to both Bill, Jr. and Ted an opportunity for higher education and security from want for Helen. In this spirit the generous gift is accepted and acknowledgment offered to all who participated. Many, many thanks."

## Homer C. McDaniel

HOMER C. McDANIEL, owner of the International Exterminator Company, Chicago, Ill., died suddenly of an internal hemorrhage on November 4. A member of the NPCA, Mr. McDaniel was an old-timer in pest control circles and greatly respected by all who knew him, including his competitors. We extend our sincerest condolences and sympathy to his widow and family.

## Are You Receiving More Than One Copy of Pests Monthly?

It has come to our notice that an occasional subscriber, through an error in our mailing department, has been receiving more than one copy of Pests monthly. If by chance you are one of these, may we ask that you kindly advise us so we may correct our records accordingly. Your courtesy will be appreciated and help us to conserve paper in the war effort. Thank you!

## Coming Meetings

Purdue PCO Conference, Purdue University, January 17, 18, 19, 20, 1944.

Canadian PCO Conference, University of Montreal, February 21, 22, 23, 1944.

Pacific Coast PCO Conference, University of California, awaiting final decision.

Southern PCO Conference, Louisiana State University, no decision yet.

## Red Squill Fortified

Substantial quantities have arrived from the Mediterranean area, but unfortunately, the toxicity is insufficient to give an adequate control of rat infestation. This problem is becoming more important because some cases of typhus fever have been reported in several southern states.

The Fish & Wildlife Service of the Department of Interior have given considerable study to rat control by means of Red Squill and have stated that material should be of 500 to 600 Mg./Kg., standard. The material lately arrived is but 1/3 to 1/4 of this toxicity.

A process for fortification has been developed by the Denver Laboratory of F&WL and WPB is releasing Red Squill which has to be fortified.

It is expected that adequate quantities will soon be available from commercial firms and PCO's can then secure material of definite potency.

Service Letter No. 310 dated November 23rd, 1943 of the NPCA gives several paragraphs on this new and important development.

### RATS HARBOR DEADLY DISEASES

That rats harbor deadly diseases was shown by the report made by the U. S. public health service, after a survey in Tacoma, Wash. in February. Out of 42 rats examined, 17 were found with bubonic plague infection, either in the tissue or on the fleas that infest rats. The rats were caught along the Tacoma waterfront.

There have been no cases of human beings getting bubonic plague in this country for several years, but the danger exists as long as the deadly Oriental disease is found on rats.

—*PCO News.*

1. The youngest attendant at the St. Louis Meeting. Dick Claws granddaughter.
2. The Raley children.
3. Better Things Through Chemistry? Du Pont party.
4. Charlie Opitz ready for action.
5. Dr. and Mrs. Thomas E. Snyder.
6. Dr. Snyder, William O. Buettner, Prof. Davis admiring Bill's new diploma. (Re-print below.)
7. The Canadian PCO.

Photographs through courtesy of Chas. Opitz, Walter McCloud and John Medoff.

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COLLEGII EXPERIENCII P. G. P. S.

Post Graduate Paternity School

*Frate in cimex lectularius, blattella germanica, mus musculus, tineola biselliella, pediculus humanus, laterodectus mactans, and reticulitermes* — Be It Known: *that since you have once more entered the field of bed pads, rubber pants, wet laps, bathinets, night walking, putrescent and unexpected aromas—that although there exists great doubt this time as to whether or not you can take it . . . in spite of your lack of training, you,* William Oscar Buettner, *are hereby granted all four corners of this* Degree of Doctor of Diapers, *including all that may fall therein, hereafter. This degree carries with it the exclusive, original or repeated privileges of getting up, picking up, lifting up, washing up, cleaning up, drying up, pinning up, and staying up. In witness thereof, we have hereunto set our hands and caused this seal with the ever remindful colors of our institution to be affixed.*

*Adam Haddem*
*I. M. Wetting*
*W. C. Dunker*
*S. Lop Pail*
*Justin Trouble*
Most Highly Constipated Board of Regents.

## Pest Control Industry Commended on Air

The world of man has been constantly waging war for at least 400,000 years.

Not a war such as the United Nations are engaged in today, but a war against insects that have been patrolling the earth for at least 40,000,000 years.

Don Pryor, commentator on "Your Home Front Reporter" radio program, sponsored by the Owens-Illinois Glass Company, and heard Mondays through Fridays at 4 o'clock, EWT, over the Columbia Broadcasting System, brought these facts to light during a recent salute to the makers of insecticides.

"Man," Pryor told his listeners, "has been on this good old earth for about 400,000 years, but insects were here long before him. Those huge dinosaurs you read about had the same trouble with the lowly mosquito that we have today.

"We may think we are in the age of man, but really we are still in the age of insects. We must fight a continuous battle against them . . . and there is hope in the future.

"Scientists today are developing newer methods of combat, methods that the insects have as yet built no adequate defense against. It is a slow battle, but a winning one.

"For instance," Pryor said, "let's take the mosquito. Soldiers in the jungles are now using a repellent that really keeps the mosquitoes at slapping distance, yet is not harmful to the skin. And an insecticide 'bomb' thrown into a tent, airplane or barracks eliminates the mosquitoes immediately.

"They have pulled a cutie on the cootie that was so tough a problem in the last war. A simple compound now kills these parasites, but quickly."

Pryor went on to tell of how the average citizen unwittingly aids insects in their campaign to destroy us, and told his listeners what steps to take for eliminating the pests.

"You can't blitz 'em," he said, "but you can keep up a steady fight . . . a fight which now can be won thanks to the tireless efforts of the scientists who produce our modern insecticides."

The insecticide industry was cited during the broadcast on one of the scheduled salutes to unheralded industries now playing a vital part on the home front.

## One Sniff Means Death

HARTFORD, CONN.—Someone was in possession today of a stolen suitcase which its owner, Robert Graham, said contained various poisons, a sniff of which might mean sudden death.

Graham, reporting that the suitcase was taken from his parked car last night, said the poisonous materials were used by his employers, an exterminating concern, to kill rats.

# Purdue Pest Control Operators' Conference, Purdue University, Lafayette, Ind.

***January 17, 18, 19, 20, 1944***

FOR the eighth consecutive year Purdue University will hold the annual Pest Control Operators Conference. The dates are Monday through Thursday, January 17-20, 1944. The changing conditions and emergencies arising out of the war and consideration of post-war problems have prompted Prof. J. J. Davis and his staff to give careful thought in planning for the essential subjects that will benefit the pest control operators.

Among those who already have signified their intention to participate in addition to the staff from Purdue University are Ira Hatfield, Technical Department, Monsanto Chemical Co.; Bernard G. Berger, Illinois Natural History Survey Division; J. Carl Dawson, Dow Chemical Co.; C. A. Vincent-Daviss, Electro Chemicals Division, E. I. du Pont de Nemours; Dr. George B. Chapman, American Cyanamid and Chemical Corp.; Dr. W. E. Dove, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture; Justus C. Ward, Wildlife Laboratories of Denver, Colo. and Galen Oderkirk, District Agent, Predator and Rodent Control Division, U. S. Fish & Wildlife Service; George L. Hockenyos, Springfield, Mass.

Detailed program will appear in the January issue but in the meantime it is expected that the National Pest Control Association will issue an industry letter inviting all pest control operators to attend. If any desire to make certain to receive a notice of the Purdue PCO Conference, write to the Office of Secretary, National Pest Control Association, 3019 Ft. Hamilton Parkway, Brooklyn (18), N. Y.

## Entomological Literature

EFFECTIVENESS OF WOOD PRESERVATIVES IN PREVENTING ATTACK BY TERMITES by Thomas S. Snyder, senior entomologist, Division of Forest Insect Investigations, and James Zetek, entomologist, Division of Fruitfly Investigations, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration.

CONTENTS: The field of wood preservation; description of wood preservatives; methods of preserving wood, nonpressure process, pressure process; service tests for timber; properties, uses and relative effectiveness of wood preservatives, impregnations with preservative oils, impregnations with clean, paintable preservatives, treatments with clean, nonswelling preservatives for millwork and furniture, miscellaneous treatments, methods of injecting metallic salts into trees; treatments for fibreboards made during manufacture; summary; literature cited.

Circular No. 683, September 1943, United States Department of Agriculture, Washington, D. C. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. Price 10 cents (in cash).

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# EVALUATION of ORGANIZATION and MEASURES for RAT CONTROL

*By* F. E. GARLOUGH*

### Introduction

IN recent years there has been much progress made in the development of methods for the control of rat populations. There are now a sufficient number of effective methods which, if used in combination and applied under the direction of a suitable and efficient local organization, may destroy most of the rats, put a stop to their depredations, and remove their menace to public health. The part of the problem requiring thoughtful consideration at the present time is that of effective organization and the proper evaluation of the methods that may be employed by a good organization, once it has been established. This calls for a careful study of the problem as a whole, for a careful consideration of every aspect of it: the conditions to be faced, the kind of organization required, and the detailed planning necessitated by these conditions.

It is not proposed in this paper, however, to offer a definite solution to this problem, but rather to suggest a plan of procedure, and to consider the extent of its adaptability.

### WHY ORGANIZED EFFORTS IN RAT CONTROL?

The control of rats is a vital problem for the general public, and not merely a problem for the individual who may have a few, or many, rats in his residence or place of business. For tomorrow these rats may be knocking at the doors of his neighbors and gaining access to some of their buildings, or burrowing in their backyards. Also, rats that cause disease in one building are a menace to persons living next door, and to the health of the whole community. Indeed, when we consider the highly infectious types of disease that are known to be carried by rats, it will be understood how dangerous they may be even to those who live in sections far removed from pest-infested areas. We may never come in contact with the pests themselves, but we are in constant danger of exposure to the diseases which these pests carry and spread.

It is folly, therefore, for anyone to remain indifferent to this serious problem on the ground that it does not touch him. It touches everyone—in many respects, as vitally as tainted water in a community touches everyone. On the other hand, granting that it is a serious social problem, it is, as we shall see, not sufficient to insist, by law or otherwise, that it is merely the responsiblity of the individual to keep his own premises clean of rodent pests. For experience has taught those engaged in the control of rodents that individual efforts by themselves are of little value in eliminating rats from a community. Individual efforts and spasmodic campaigns, with no follow-up, and without constant vigilance, have not gained, and cannot gain, much lasting benefit. This requires the organized, united effort of a great many persons, as well as official authority to compel cooperation wherever that may be necessary.

The reasons for the failure of even the best-meaning individual kinds of control operations are many, but most important of these are the habits and natural traits of the rats, an understanding of which makes it plain that once a community or area becomes rat-infested, the task of getting rid of the menace becomes too great for the individual to handle.

What are these habits and traits? There are, of course, many that the control operator has to learn and meet, but it will suffice here to consider only five of them, the five that are of greatest importance:

1. **Prolific**—The rapid rate at which rats multiply is well known. They may have three to twelve litters a year, with an average of five litters. The young start breeding when they are about three months old, and have from three to as high as twenty-two to a litter, with an average of nine. The gestation period is twenty-one to twenty-five days (fig. 1).

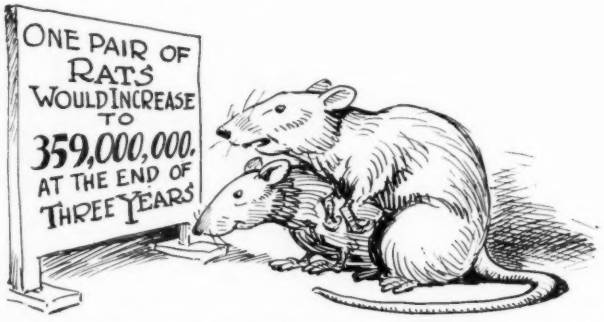


**Fig. 1—The progeny of one pair of rats computed in accordance with normal breeding possibilities without considering natural mortality.**

To counteract this trait, all harborage for rats must be removed and prevented. All places in which they may have nesting places must be destroyed.

2. **Voracious**—Rats cannot live many days, nor remain for very long in any location, without food and water.

Obviously a method to drive them away or destroy them is to keep food and water out of their reach. This is why it is important to keep carefully covered all foodstuffs inside of buildings, and to place only in rat-proof containers all garbage or other forms of rat food that must be kept outside of buildings (figs. 2 and 3).

**Fig 2—Illustrating the destructiveness of rats and their annual economic bill.**

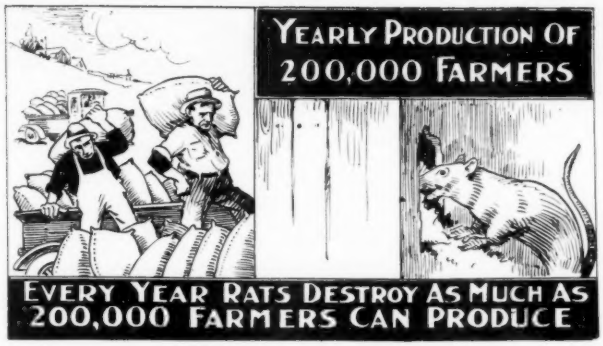


**Fig. 3—Illustrating annual amount of food the rats take estimated in accordance with their natural feeding habits.**

3. **Nomadic**—Rats drift about considerably from a central point until they become established in a new location.

For this reason it is essential that they be prevented from establishing central points of concentration in such areas as city dumps (fig. 4), river banks, vacant weedy lots, garbage pits, and the like, any of which may act as a reservoir of supply of rats to buildings, residences, and backyards (fig. 5).

4. **Adaptable**—Rats readily adapt themselves to a change of local conditions or to any new location to which they may find access.

For this reason it is necessary:

(1) To close all openings to buildings from the outside.
(2) To avoid double walls and accessible boxed-in spaces in the construction of all new buildings.

**Fig. 4—Showing the condition and location of a city dump at the edge of one of our larger cities. This serves as an excellent reservoir from which rats migrate to city residences, buildings, alleys, vacant lots, and even into the surrounding rural areas.**

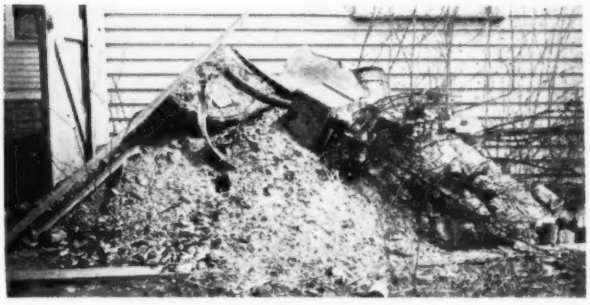

**Fig. 5—Note the opening to the rat burrow in the pile of rubbish left in the background. The rat came along, discovered it and appropriated it to its needs.**


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(3) To block the spaces between studs.

(4) To close with metal flashing or cement all openings in floors or partitions made for the passage of pipes.

(5) To avoid openings to spaces behind or beneath built-in fixtures in buildings.

These are factors that the architectural engineer and building contractor should consider as carefully as they consider the location of doors, windows, and partitions in a new building.

5. **Aggressive**—Rats are always on their toes and are ready to take advantage of any opportunity, and of any relaxation of effort on the part of those who would combat them (fig. 6). Whenever and wherever man is not alert and does not apply proper control measures, the rat's aggressiveness, coupled with the other traits given, affords him the opportunity to grow and multiply, and to continue his destructive and menacing operations, always on the offensive against the weak and seemingly futile efforts of the individual home-owner or occupant of a building in a rat-infested area.

**Fig. 6—This illustrates an aggressive rat that came up through the sewer pipe to get into this building and found this broken and unrepaired grating which fit nicely into its plans for gaining entrance.**

Half-way or spasmodic measures simply will not work against an aggressive creature like the rat. Too often such measures prove to be "too little and too late." Indeed, there is a striking parallel between the methods that must be employed in fighting rats and those that must be employed by society in combatting the aggressor nations in the present world conflict. Complacency, indifference, "appeasement," always prove more costly in the end. Half-hearted efforts, or the hope that these rodents will be satisfied to remain where they are is simply to indulge in wishful thinking. Man has engaged in a purely defensive war against the rat for centuries, and the results obtained during these centuries indicate that man has thus far been the loser. Certainly the rats have not been brought under control. Their populations have been reduced in certain small areas, but their general number has remained about the same, and has often increased in some areas. Only when we apply control measures systematically, thoroughly, continuously, extensively, and energetically—both to prevent rat infestation and to obtain, by means of trapping, fumigation, and poisoning, the greatest possible reduction of existing population, can we hope to make any real headway against this dangerous and destructive enemy.

Everyone who knows anything about rats, who is familiar with their habits and natural traits, and is aware of their costly depredations to our economy and to our health realizes what the true nature of the rat control problem is. Failure is due to two causes: One, the lack of a permanent, efficient, and energetic local organization in each rat-infested community to direct control operations; and, two—which is the cause of the first—the complacency of the citizens and public officials respecting the conditions that are favorable to the development of rats, and to the conditions that are caused by them.

In some cases, necessary rat control measures may prove costly. Public officials may be reluctant to undertake such measures for various reasons, especially if the public is not sufficiently aware of the need. In such cases, the public officials should advise the general public regarding the seriousness of the rat menace, and the need for organized control operations. When public officials, for whatever their reasons, fail to accept this responsibility on their own initiative, the citizens of a community where rats are present should make it clear that they want an efficient organized rat control system with which they can cooperate, both to remove the rats and to maintain permanent control over them. Complacency on the part of the public may be due to ignorance. In such a case, it is necessary that some individual or some civic body undertake to arouse them, and to make them understand that it is they who suffer from this menace, not only as individuals, but as a whole community, and not alone from economic losses—though in some communities these may be considerable. But what is doubtless more important, rats are a serious menace to the health of a community. They are, as has already been said, carriers of many dread diseases. And, apart from the diseases they are known to carry—typhus fever, bubonic plague, and many others—not infrequently when a disease of unknown origin strikes a community, it is discovered to have struck first in rat-infested areas. Complacency, therefore, on the part of the citizens of a community, no matter how far removed they may be from rat-infested areas, may be considerably more dangerous than they think.

Experience indicates that if the public can be aroused, good results are bound to follow. For in several localities recently, where energetic leadership on the part of those who were in a position to effect public opinion became evident, a real interest in the problem of rat control followed, and excellent results began almost at once to make themselves felt. What is more, evidence of interest in this problem on the part of the citizens of a community almost invariably gets a favorable response from the local authorities. It would seem that where officials may hesitate to act on their own initiative, they do not hesitate once they are convinced that the public will approve the necessary action and expenditure.

### Organization

An effective campaign against the rat menace requires a systematic procedure, which in turn demands a **permanent** organization. Now, the nature of this organization will depend naturally upon the size of the project. Let us, therefore, for the sake of convenience, limit our consideration at the outset to a project for a city of 150,000 inhabitants. This would require a detailed setup, which could be augmented or contracted in accordance with any specific requirements.

The details of a permanent organization for a project of this size will depend upon the departments of the city government. In a city where there is a strong, well organized City Health Department, all the details of the project could be handled within the department itself. But even in such a city it may be necessary, and is often advisable, to establish a specially designated "Rat Control Advisory Committee."

The membership of such a committee could be drawn from the City Health Department; from the State and

Federal Public Health services, where these are present; from other local Medical Associations; from the Junior or Senior Chambers of Commerce; and from one or two active Citizens Associations.

There need not be more than five or six members in the committee, and they should be selected because of their active interest in the public welfare. This committee should meet at least once a month, preferably more often, with a trained rat control specialist, who will be able to advise them regarding their activities. This trained rat control specialist should be in charge of the entire project, under the general supervision of the Director of the City Health Department, or of the Director of the department that is charged with this work. In some cities an effort is sometimes made to divide the rat control project among several departments; but this has not proved successful.

The functions of the "Rat Control Advisory Committee" are:

1. To concern itself with the general procedure of the work.
2. To act as a buffer against outside interference with the progress of operations.
3. To release publicity pertaining to the project.
4. To raise money, if that is necessary, and to supervise its expenditure.

The official who is charged with the supervision of this project should understand that a project of this nature requires, in addition to the use of the most effective techniques of control, a carefully planned educational program, for without the willing and determined cooperation of the public, such a project is not likely to succeed. He should have as superintendent of the project a man of energetic ability, a good executive, capable of arousing enthusiastic support on the part of homeowners, of occupants of rat-infested buildings, and of all the inhabitants of the community.

The number of persons under the direction of the superintendent of rat control will depend on the funds available and the extent and character of the work that is to be done. There are the following divisions of work in the program:

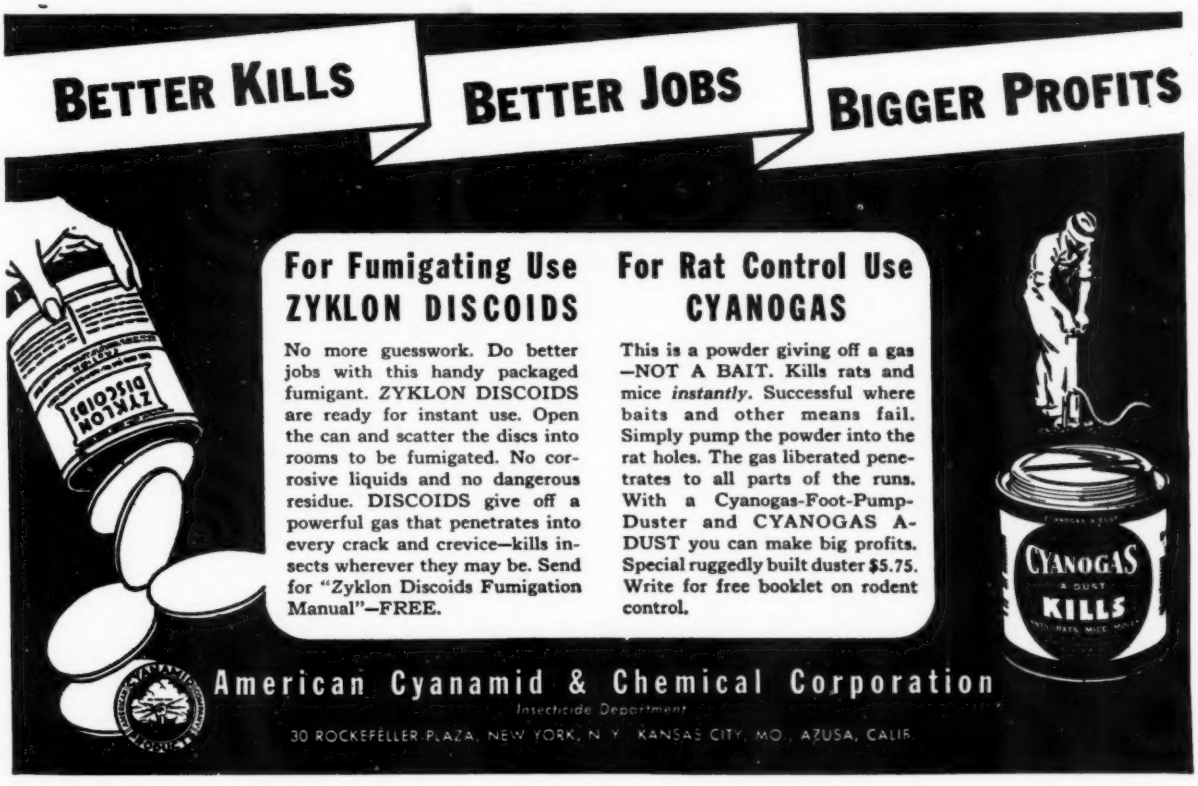
1. Education as to the habits of rats and methods of control.
2. Survey of rat conditions.
3. Garbage disposal and harborage removal.
4. Vent stoppage and rat proofing.
5. Reduction of rat population.
   a. Trapping section.
   b. Fumigation section.
   c. Poisoning section.

The educational phase of the work may be conducted by the superintendent of the project who can work through the newspapers, radio stations, schools, business organizations, citizens associations, and special schools for training in rat control methods.

A city of the size being considered is too large to be able to have a sufficient number of workers to cover it entirely at the same time. Hence, the city may be divided into zones and each zone then systematically handled by specially trained personnel working in cooperation with a volunteer local organization which can do the follow-up work when the official personnel proceeds to the next zone. The volunteer group can work in close cooperation with the superintendent of the rat control project, who can assist in those places where particular difficulty with rats again occurs. After observing the manner in which the regular force conducts the work, the local volunteer group and the householders should be able to destroy minor rat populations.

In each zone, a survey of rat conditions should first be made about each piece of property, such as a vacant lot, building, steam bank, or docks and wharves. Such

(Continued on Page 28)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# RECENT DEVELOPMENTS IN ROACH CONTROL

*By* GEORGE E. GOULD, *Purdue University, Agricultural Experiment Station.*

RESTRICTIONS on the use of pyrethrum and the shortage of sodium fluoride has caused serious difficulties to Pest Control Operators, who have depended in large part on these two materials, either alone or in combination, for the control of cockroaches, especially the German roach. Several substitutes have been offered to replace these materials, while some new chemicals have been proposed for roach control. It is the purpose of this paper to bring together all the recent information on the research now being conducted in this field with hope of suggesting non-priority materials that may aid in the control of roaches.

In the past roaches have been effectively controlled by the use of sodium fluoride and pyrethrum as dusts, phosphorus paste as a bait, and, to some extent, hydrocyanic acid gas as a fumigant. The success of the sodium fluoride and pyrethrum dusts, either alone or in combination, has been so outstanding that little research has been conducted on other materials. Phosphorus paste has been an outstanding success against the larger species of roaches and to some extent against the brown-banded species. Fumigation of premises has been resorted to in some instances where the roach population was large. Two other methods, spraying and trapping, have not found favor with commercial men in this country. Spraying, usually with a pyrethrum-type household spray, is frequently practiced by home owners, but commercial men are of the opinion that the odor of the spray drives the roaches ahead of the spraying operation, so that few are ever hit by a lethal dose. Trapping is an old recommendation which probably originated in England where roaches were attracted to fermenting beer into which they fell and drowned. Many traps have been devised in this country, but to date none have effectively eradicated roaches from a heavily infested premise.

Before discussing the materials to kill roaches, it would be well to review the literature on the mode of lethal action of our common roach poisons. A great deal of confusion exists among PCOs as to the lethal action of sodium fluoride. It is well known that sodium fluoride will act as a stomach poison, that is, taken into the stomach by way of the mouth, for both man and roach, but less well known is the fact that this poison in most instances kills roaches by contact action. Shafer (1915), Hockenyos (1933, 1936, 1939), Munger & Siegler (1937) and Sweetman (1941) have published data proving that sodium fluoride passes through the body wall, especially the unsclerotized portions of the sternum of the abdomen and thorax. In a recent article by Griffiths & Tauber (1943) it was found that American roaches had to be starved before they would feed on a sodium fluoride paste and required 3½ days for males and 6½ days for females to die. Male roaches walking through the poison died in an average of 33 hours and females in 52 hours. In these tests roaches with their mouthparts sealed died before those with unsealed mouthparts.

The action of pyrethrum in killing roaches has been described in detail by Campbell (1942). This material acts as a contact poison, apparently passing through the body wall, and does not act as a fumigant or stomach poison under ordinary procedures. Pyrethrum exerts a characteristic effect on the nervous system of roaches, resulting in muscular excitations, convulsions, paralysis and death or recovery depending upon the dose. Pyrethrum usually causes the female German roach to drop her egg capsule prematurely, although these eggs will hatch in a moist location if normal hatching would have occurred in a day or two.

Cheng & Campbell (1940) have studied the action of phosphorus on the American and German roaches. The American species is attracted to and imbibes freely of phosphorus paste, being killed by a dose of 0.02 mg. per gm. of body weight. The German species was not attracted to the paste and did not feed willingly on it. A dosage of 0.13 mg. per gm. of body weight was necessary to kill this species.

### Physical Properties of Dust Mixtures

The effectiveness of a dust mixture depends to a large extent upon its physical properties. In general, materials with the smallest particle size will give the best results. Recent tests by the author indicate that in the case of sodium silicofluoride samples with the smaller particle size gave good control of the German roach, while those of larger size gave a poor kill. One objection to the use of sodium silicofluoride in the past was its lumpiness and large particle size. Recently a finely ground, fluffy material has been placed on the market and has given excellent results on the German species.

One difficulty encountered with finely ground, fluffy materials is their dustiness when blown into the air. While a certain amount of fineness is desirable, many materials stay suspended in the air and cause irritation to the operator. This is true of light materials, such as pyrethrum powder and finely ground sodium silicofluoride. Many complaints concerning the severe nasal irritation from silicofluoride have been received, but so far no remedy has been suggested. A small percentage of light oil has been added in some instances to reduce the dustiness of pyrethrum and sodium fluoride.

Diluents also affect the physical condition of mixtures. In general the diluent should be as fluffy and as finely ground as the active ingredients which it carries. In our tests pyrophyllite has been an excellent carrier for all materials, as it is finely ground and has the proper degree of fluffiness. This material is readily available and cheap, selling for seven or eight dollars a ton f.o.b. the mine. Some diluents, such as diatomaceous earth, are too fluffy, while others, such as gypsum and certain clays, are too heavy. Other materials, such as certain starches and dextrines, and flour, are so fine that they adhere together to form a lumpy mixture that blows unevenly from a duster. Certain diluents, especially the clays and bentonite, have the property of combining with and holding the active ingredients.

### Substitute Materials

Many materials have been suggested as substitutes for sodium fluoride and pyrethrum, but none have been so widely used as borax. Borax for roach control was an early recommendation and even to the present time is widely used, especially with pyrethrum in locations where poisons are forbidden. In our tests where roaches ran through the borax for eight minutes and were allowed a maximum of four days to die, the kill of male German roaches was only 10 per cent and only seven per cent for females. Klostermeyer (1943) obtained a 100 per cent kill of German males and 95 per cent kill of females when the tests were allowed to run 10 days. He reported that sodium fluoride, sodium fluosilicate and borax were equally effective, while pyrethrum was comparatively low in toxicity. The poor results obtained with pyrethrum by Klostermeyer are hard to explain as most workers have had excellent results with this material.

The value of boric acid was called to the attention of this association at its annual meeting last year by F. L. Campbell, who pointed out an article on this material by Walter in 1918. During the past year many commercial as well as research men have checked the efficiency of this material. George Hockenyos reported on his tests at the Purdue PCO conference in January, 1943, and stated that boric acid was better than borax and that it would kill roaches in a 10-day period. In our tests conducted as described above, boric acid gave a 46 per cent kill of German males and a 58 per cent kill of females. When 10 per cent powdered sugar and 10 per cent pyrophyllite were added to the boric acid, the kill was increased to 82 and 58 per cent respectively, while with 25 per cent sugar and 15 per cent pyrophyllite, the kill was 92 and 70 per cent. Boric acid in mixtures with pyrethrum and with sodium fluoride gave better results than borax with the same materials. Barnhart (1943) reports that an aqueous solution of boric acid in vials placed in infested premises will clean-up the roach population. He used a solution containing 1½ per cent of boric acid crystals. This solution does not attract roaches and so many vials should be used.

Marcovitch (1942) has suggested that the volatile fluorine compounds would make excellent insecticides, but Roark (1943) states that these materials are so dangerous to human life that they could not be used.

Sodium silicofluoride (fluosilicate) has given excellent results in all tests conducted in the past two years. In our tests seven different samples of various particle size were used against the German roach. It was found that those samples of small particle size (4 to 10 microns) in general gave excellent results. Except for the undesirable nasal irritation caused by this material, sodium silicofluoride would make the logical substitute for sodium fluoride. In the past year or so several companies have been manufacturing a finely-ground, fluffy material. A sample of this new material in our tests gave good results even when diluted with equal parts of pyrophyllite.

### New Organic Materials

Recent investigations by Seiferle, Johns and Richardson on the alkaloids found in hellebore revealed the presence of three alkaloids toxic to insects. One of these, Germine, was slightly toxic to the American roach. Another plant product listed as toxic to roaches by McIndoo and Sievers is Sabadilla.

At the present time several new materials are under investigation for military purposes and their uses and effectiveness on insects are for the most part military secrets. After the war and perhaps sooner if the supply of these chemicals is abundant, many of these materials will be released for general use. One such material which has been mentioned in a general way, is the chemical called dichloro diphenyl trichloroethan or 2,2-bis (parachlorophenyl)-1, 1, 1-trichloroethane. It has been sold in Europe under the names Gesarol and Neocid and was patented in the United States on September 7, 1943. This material is highly toxic to humans and is reported effective on body lice. In our preliminary tests of this material mixed with pyrophyllite as a dust, its toxicity to German roaches was rather low, especially the females.

Phenothiazine gave practically no kill of German roaches in our tests. The article by Zukel on the killing of roaches with this chemical is a study of the physiological action involved rather than a suggested remedy.

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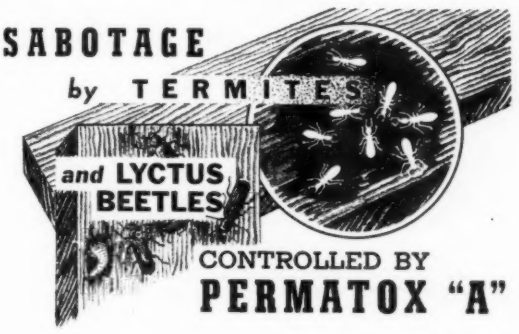


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# RAT CONTROL: A City Administration's Point of View

*By* **FRIEDA SCHICHT**, *Secretary, City of St. Louis Rat Control Program.*

*Delivered before the NPCA War Emergency Meeting, Hotel Statler, St. Louis, Missouri, October 27, 1943.*

MR. CHAIRMAN, Members of the National Pest Control Association, Ladies and Gentlemen:

It is my understanding that this meeting differs from those held in the past, and that the fanfare usually in evidence at a convention has been dispensed with. Since you have not been officially welcomed by a representative of the City Government, the Honorable A. P. Kaufmann, Mayor of our City, has delegated this privilege to me. He has asked me to extend to all of you a warm and sincere welcome to Saint Louis—the foremost city of the Mississippi Valley. Your group is making an important contribution to the Nation's War Effort, and the Mayor has expressed the hope that your meeting here in Saint Louis will prove eminently successful and profitable, as well as enjoyable.

You are meeting in this City in the midst of a campaign that has been under way for about a year, to combat an infestation of rats that over-ran the city. The City Administration sponsored this movement, and is making every effort to achieve results. As I have had some interest in this movement, it is a privilege and a pleasure for me to discuss the topic assigned to me for today—"Rat Control—A City Administration's Point of View."

Saint Louis, as most of you know is an old city, having been founded in the year 1764 by Pierre Laclede, the fur trader. Being the metropolis of the "Show Me State" it seems natural for Saint Louisans to tell the visitors to our fair city something of our history, our accomplishments, and our plans for the future. We love to tell the visitor that today Saint Louis is one of the greatest fur trading cities in the world, and that the only seal fur-curing plant in the United States is located here; that we have the largest brewery in the world, the biggest shoe factories, chemical plants, the largest and finest outdoor theatre, the finest zoo, and the next to the largest park in America, to mention only a few of the biggest and the best. Saint Louis is known as a City of Beautiful Homes and charming residential sections. Many homes are noted for their architectural beauty, and their attractively landscaped lawns and gardens. While there are a large number of apartment buildings, the vast number of single family homes indicate the high percentage of its people who are home owners and home lovers. Saint Louis was one of the first American cities to adopt city planning, and this has resulted in many transformations.

Being situated in the heart of the soft coal belt, this fuel is used here almost exclusively, and for years we suffered from smoke palls which hung over the city most of the fall and winter season. Rarely was the blue sky visible. After years of agitation from first one group and then another, Saint Louis has finally banished the smoke evil. The smoke elimination program, which was begun in 1940, has made Saint Louis a smoke-free city. During the winter of 1942-43 the weather bureau reported fourteen hours and fifty minutes of dense smoke, and one hundred and twenty-seven hours ten minutes of moderate smoke, as compared with one hundred and seventeen hours thirty minutes of dense, and five hundred and ninety-nine hours of moderate smoke during the winter of 1939-40. Today we boast that golden sunshine and blue skies look down upon us.

We are proud of our city and its accomplishments, but likewise we are fully cognizant of its shortcomings, one of which is that during the past we have allowed our citizens to become very careless in observing the rules and regulations in connection with the disposal of garbage, and the accumulation of ashes and rubbish in ashpits. We have an ordinance which provides for municipal rubbish collection, but there has never been any money appropriated to carry out the provisions of the ordinance, and for the time being at least we shall have to continue with our present system, because war shortages prevent the institution of municipal collection at this time. Whether this has been a factor, or direct cause for the heavy rat infestation I shall not try to determine. The fact is that rats are present in large numbers in most sections of the city, and they constitute a potential menace to the healh and welfare of our citizens, and from an economic point of view, the destruction of property and the spoilage of food due to the depredations of the rat must be stopped.

Our late Mayor, William Dee Becker, who so tragically lost his life in the crash of the ill-fated glider a couple of months ago, felt that it was the duty of the City Administration to take steps to remedy this situation. The task was assigned to the Director of Public Welfare, the Hon. Henry S. Caulfield, who called a series of conferences with the heads of some of the City's departments, and representatives of civic organizations, and as a result the City of Saint Louis Rat Control Program was established. Mr. Milton C. Lauenstein, the Chairman of the Council on Civic Needs was made Chairman, the Director of the Civic Bureau of the Chamber of Commerce was made organization chairman, and these men together with the heads of the Health Division, the Department of Streets and Sewers, the Chief of Police and the Fire Chief constitute the Executive Committee.

It was considered necessary to the success of any sort of campaign to enlsit the aid and assistance of all the citizens. As it had been decided to divide the city into districts, the best units for this were the Police Districts, and for each District a Chief was appointed—someone well known in his district—to head the district, and to enlist the help of the residents in that particular section of the city. These people were known as District Chiefs, of which there are eleven men and one woman, doctors, lawyers, and business men.

It was probably fortunate that none of the members of the Committee had had any experience in carrying on a campaign to rid the community of rats, because they were all disposed to seek advice. By a coincidence the women in Saint Louis County were conducting a campaign of Rat Elimination, and this came to the notice of the members of our committee. I might mention at this point that Saint Louis County is an independent political unit, over which the City has no jurisdiction.

The United States Fish and Wildlife Service Predator and Rodent Control Section of the Department of the Interior had assigned Mr. Milton Caroline to work with these women in the County, and after a conference with Mr. Oderkirk, we considered ourselves extremely fortunate in being able to secure Mr. Caroline's services, after he had completed his contract in the County. His stay was very brief, however, because Uncle Sam took him into the Navy, but in spite of this we felt that he had guided us into the proper channel. Of course we still had Mr. Oderkirk to look to for advice and assistance, and I do not think it would be out of order to mention at this time that he helped us materially, and I want to take this occasion to express our thanks to him, and to make public acknowledgment of his helpful guidance. I am sure without this we might have started a campaign which would have lasted only a few weeks, and of course you know that would have been the end. We decided that if we were to eliminate rats from our midst, we would have to spend a great deal of time, and study the problem from numerous angles. We knew that a spasmodic, sporadic campaign would be of no avail, and that we would have to carry on a sustained program. After having carried on our operations for a year, we know that we have only scratched the surface, and that much remains to be done. The big accomplishment, as I see it, was to get started.

We adopted the calcium cyanide dusting method of extermination. On October 19, 1942, the actual extermination part of our program got under way, and if anyone had told me last year that I would be up here this afternoon telling you gentlemen about our program, it would have seemed impossible. I do not think it would be considered exaggeration, or overstatement, to tell you that our efforts have not been in vain, in fact we can show some gratifying results. We receive reports from citizens stating that they seldom see any rats in their neighborhood, or at least not as many as they did before we got to work on them.

Our program was launched with a meeting of representatives of various civic groups, the District Chiefs and their workers, at which the Mayor set forth the general plan of the Program, and called upon the citizens to give it their full support. The Program was three-fold, namely (1) Educational, explaining why we must eliminate rats from our midst; (2) Elimination of food and harborages and the rat-proofing of buildings and (3) Extermination.

The Office of Civilian Defense had divided the City into the twelve Police Districts, then into zones and posts, and these were ideal for our purpose. There were 84 zones and 1,679 posts. Each District Chief was provided with a map of his district, showing the zones and posts, and was asked to appoint zone deputies and post workers. Meetings were held in the various districts, in schools, libraries, or other convenient places, at which the volunteers were given information about the rat menace, and how to combat it. 300,000 copies of instructions to the householder were printed for general distribution, giving explicit do's and don'ts. The workers were charged with the responsibility of seeing that each householder received a copy, and explaining to him the things necessary to be done to co-operate in the movement to reduce the number of rats in the city. The householder was told about the preventive measures, such as elimination of rat harborages, the

rat-proofing of doors and windows leading to basements, the importance of the garbage container being provided with a tight-fitting lid, the necessity of keeping all foods edible by rats, in rat-proof containers, such as chicken feed, dog food, and so forth. The instruction sheet also pointed out that the scattering of feed for birds on the ground was bad practise from the standpoint of rat-riddance, and any food intended for birds should be placed in a bird feeding station, raised well above the ground, and made inaccessible to rats. It also gave instructions on baiting and trapping.

We started out with four crews of two men each to do the exterminating work, and worked according to a pattern, beginning at the southern end of the city, and working north to the downtown area. This was in the month of October, and we were anxious to get as much territory dusted as possible before the winter weather set in. After working for a short while it became apparent that it would take a good deal more time than had originally been calculated. There are four hundred and thirty miles of alleys in the city, and covering both sides of the alleys, and all back yards and garages and sheds entailed more work than we had estimated. For a few weeks we borrowed twenty men from the Fire Department, and other City Departments who wanted to do this work. They were allowed time off from their regular jobs, and devoted a few days to rat extermination. Some of them regarded this in the nature of going hunting, and really enjoyed the experience. We cleaned up a large territory by this method, but when the weather got bad we discontinued drawing on other departments for help.

Naturally we received publicity in the daily press about this work, and the result was that in every section of the city people wanted us to send our crews to exterminate the rats in their particular neighborhood. Obviously this was impossible. In order to satisfy them it was decided that if anyone would volunteer to use the gun, we would lend it to him, and give him the dust, and this would enable him to clean up his own neighborhood. It was a big order to get all of the twelve districts organized simultaneously, and we found we had to take one at a time, rather than try to do the whole city.

Rat Control Programs are being conducted in a number of cities, but I believe that our Program differs from them in the volunteer phase. We have a group of over a thousand men and women enrolled in our army to wage war on the rat. Some seven hundred and fifty have been trained in the use of the dust guns. Classes are held at regular intervals in different sections of the city. The volunteers are taught how to locate rat burrows, and are instructed in the use of the dust guns, and the necessary precautions to be exercised in the use of calcium cyanide. They sign an agreement that they will not give the gun to an untrained person; that they will dust the entire block in which they reside, not merely their own back yard, but the whole block, each side of the alley. Guns are issued to the volunters for a period of two or three weeks, and they are furnished with the necessary amount of calcium cyanide, for which of course no charge is made. The training of volunteers and the dusting operations are under the supervision of a Sanitary Officer of the Health Division. As rats reappear, and the volunteer wishes to redust the area, guns are made available. We have one hundred guns in circulation.

Of course the law of averages applies to our volunteer workers as well as to anything else, and consequently we find that they do not all work out one hundred percent. As a general rule, however, the volunteers have done a splendid job. We have enrolled business men, lawyers, dentists, policemen, salesmen, white and colored, as well as some women, who have taken the guns and done the actual extermination of rats. Most of them report they really enjoy doing the work. One of the results, aside from ridding the community of a large number of rats, is that neighbors become better acquainted, and they have become interested in improving their neighborhood, and have found it both profitable and enjoyable, and above all they realize that they must all work together in order to achieve results, and that Rat Control is an area problem, and therefore every citizen must do his part.

A few of our men have volunteered to take over a whole area, and have devoted some time every day to checking up on conditions, and have done a wonderful job. These areas have shown a marked improvement in the sanitary habits of the people, as well as a reduction in the rat population.

At this point some of you gentlemen might wonder why the City of Saint Louis did not contract with the local Pest Control Operators to have the work done, instead of hiring our own men to do the work, and have volunteers assist. I believe you will all appreciate the fact that this would involve the expense of a far greater amount of money than we had available for Rat Control, and it is questionable if enough manpower could be obtained—if we had the necessary money.

It is our sincere hope that through our educational program we will make all the citizens rat-conscious. Most of them knew that rats were present in large numbers, but until they were told that abundant food and convenient harborages encouraged them, it had

(Continued on page 17)


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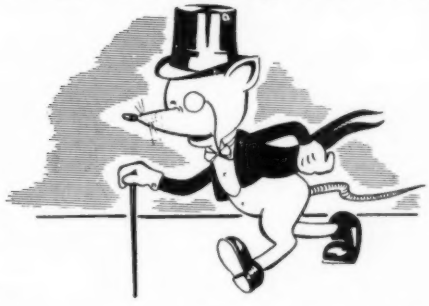

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# Fourth Annual Eastern Pest Control Operators Conference

## *January 10, 11, 12, 1944*

THE WAR EMERGENCY and attendant post war conditions make it imperative that there be continued Pest Control Operators' Conferences next year. The first of the series of sectional conferences will be held at Massachusetts State College, Amherst, Mass., Monday, Tuesday and Wednesday, January 10-11-12, 1944. The program that has been arranged clearly shows the importance of the problems to be discussed and requires no sales' talk by way of urging attendance. Massachusetts State College is not unlike other institutions throughout the United States that have given over very largely their facilities to the Armed Forces for specialized training but even under such pressure Dr. C. P. Alexander, Head of the Department of Agriculture, Prof. A. I. Bourne and the staff are giving of their best efforts on behalf of pest control operators, confirmed in their conviction that pest control services are essential to the health and welfare of the homefront and contribute substantially in the conservation of food and other commodities resulting from control of insects and rodents.

The registration fee is ten dollars and application should be made directly to F. E. Bohman, Treasurer, 173 Church St., Hartford, Conn. The application fee includes the banquet and a copy of the Conference Manual.

It is urged, however, that reservations be made early as to transportation, especially if pullman accommodations are required.

Monday, January 10—9:00-9:30 A.M.—Registration, Farley Clubhouse.

**January 10—MORNING PROGRAM—9:30 A.M.—Farley Clubhouse**

Greetings.....Dr. C. P. Alexander, Massachusetts State College

Address of Welcome.....Pres. Hugh P. Baker, Mass. State College

"Weights and Measures"....Milford Oachs, Ozane Co., N. Y., N. Y.

"Plant Materials as Sources of Insecticides".....Dr. T. Roy Hansberry, Cornell University

"Pest Control and Pest Control Training in the First Service Command".....Lt. Donald DeLeon, First Service Com. Lab.

**January 10—AFTERNOON PROGRAM—2:00 P.M.—Farley Clubhouse—S. Rohdie, presiding.**

"The Importance of a Research Program in the Pest Control Industry".....Dr. Charles E. Palm, Cornell University

"Research Projects With Emphasis on Moths".....J. Edwin Sameth, Western Ext. Co., Newark, N. J.

**RODENT CONTROL SECTION:**

"Cities Ready to Launch Rat Control Program"....George B. Lay, Dist. Agt., Region 5, U. S. Fish & Wildlife Serv., Boston, Mass.

"Bio-Assaying Demonstration—Red Squill".....Justus C. Ward, Pharmacologist, Wildlife Research Lab., U. S. Fish & Wildlife Serv., Denver, Colo.; Ernest M. Mills, Asst. Dist. Agt., U. S. Fish & Wildlife Serv., Region 5, New Brunswick, N. J. and Leonard R. Parkinson, Research Asst., Nutrition Laboratory, Massachusetts State College.

"Making Solutions of Toxic Poisons".....Ernest M. Mills and Robert M. Borg, Asst. Dist. Agt., Region 5, U. S. Fish & Wildlife Service, Worcester, Mass.

"Rat-proofing Made Easy".....Robert M. Borg

"Mr. Careful and Mrs. Careless"—A Skit—John K. Medoff, Hudson Ext. Co., West New York, N. Y.; Sidney Wimmer, Majestic Chemical & Ext. Co., New York, N. Y.; Fred Bowers, Bowco Laboratories, Rahway, N. J., and Ernest M. Mills.

**January 10—EVENING PROGRAM—7:15 P.M.—Fernald Hall—George R. Elliott, presiding.**

"Elusive Irritations".....Dr. James O. Wails, Health Commissioner, Worcester, Mass.

"Habits of Miscellaneous Rodents".....Robert M. Borg (such as squirrels, chipmunks, moles, woodchucks, etc.; specimens to be displayed).

"Control of Miscellaneous Rodents".....George B. Lay (A brief outline of control principles, procedures and equipment, with demonstrations).

"Questions and Answers".....Ernest M. Mills

Movies, "Vandals of the Night"—Two reels of sound colored rat movies.

**January 11—MORNING AND AFTERNOON PROGRAMS—9:30 A.M. and 2:00 P.M.—Fernald Hall—Prof. Arthur I. Bourne, Chairman.**

Conference Group divided into 2 sections which will alternate in accordance with announcements by chairman.

SECTION A.—Laboratory work, identification, morphology, classification and life cycles of insects: with special attention given to

"Species of Flies Commonly Found in Houses".....Dr. C. P. Alexander and members of Dept. of Entomology, Massachusetts State College.

"Species of Blowflies".....Dr. Charles H. Lake,, Massachusetts Institute of Technology.

"Display and Demonstration of Electric Fly Screen Equipment".....Detjen Corporation, New York, N. Y.

SECTION B.—"Identification of Insect Damage and Association of the Insects With the Injury They Cause".....Dr. H. L. Sweetman and W. B. Becker.

3:45 P.M.—The entire Conference Group will reconvene.

"Protection of Buildings from Termite Damage, with Special Reference to Wartime Conditions".....Dr. Neely Turner, Connecticut Agricultural Experiment Station.

**January 11—EVENING PROGRAM—6:30 P.M.—Annual Banquet—The Lord Jeffery Inn.**

Toastmaster.....William O. Buettner, Secy., Nat. Pest Cont. Assn.

Guest Speaker.....President Hugh P. Baker, Mass. State College

**January 12—MORNING PROGRAM—9:30 A.M.—Farley Clubhouse—Bartlett W. Eldredge, presiding.**

"Additional Chemical Meanings for Pest Control Operators" C. A. Vincent-Daviss, Electro-Chemicals Division, E. I. duPont deNemours & Co., Inc., Wilmington, Delaware.

"Fumigation Problems".....Bartlett W. Eldredge, Waltham Chemical Co., Waltham, Mass. Leader—(Specific fumigation problems will be analyzed by representatives of fumigant manufacturers):

Dr. George H. Chapman, American Cyanamid & Chem. Corp.
C. R. Vincent-Daviss, E. I. duPont deNemours & Co., Inc.
J. Carl Dawson, Dow Chemical Company
Charles W. Houghton, Safety Fumigant Company
Conrad C. Johnson, Innis, Speiden & Company

"Questions and Answers"—All participating.

**January 12—AFTERNOON PROGRAM—2:00 P.M.—Farley Clubhouse.**

"The Health of the Nation and the Part the PCO has in Such Program"—(Tentative)—Dr. W. E. Dove, in Charge, Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C.

"Summary of Bio-Assay Tests of Red Squill".....Justus C. Ward

"The Pest Control Industry in Our All-Out War Program".....William O. Buettner

(An Open Forum will follow relative to specific problems of supplies, equipment and manpower.)

### HOTEL ACCOMMODATIONS

Every person attending the Conference is expected to make his own hotel reservations. We suggest that you write **directly to the hotel** and make your own reservations. We also suggest that

(Continued on page 23)

(Continued from Page 15)

not occurred to them that they were actually responsible for the presence of this pest. The ultimate object of our program, in addition to a material reduction in the rat population, is the improvement of sanitary conditions through the elimination of harborages and shelters, by cleaning up unsightly spots in back yards and alleys, weeds and rubbish on vacant lots, and converting them into grassy plots and flower or vegetable gardens. A small amount of imagination and a sufficient amount of elbow grease can work miraculous changes. We hope to include in our new building code regulations for the rat-proofing of buildings, the extermination of rats in old buildings, prior to their demolition, and to sponsor ordinances which will eliminate by law some of the conditions which have arisen because of the carelessness of our citizens, and the laxity of the enforcement officers.

We have been urged to distribute poison bait to the citizens, but we have felt that it was not our province to do this. After all it is the duty of the individual to help himself, but we find some who feel that as long as the City is engaged in a Rat Control Program, we should come into their homes and exterminate the rats which are being harbored there. You can imagine how busy we would be if we followed such a program. These people are referred to the local Pest Control Operators.

Up to now we have confined our efforts to the residential sections of the city, and have not attempted to do anything with the Industrial and Business Sections, as these present an entirely different problem, and I believe that most of these places are being serviced by members of your organization. We are not in any way in competition with the Pest Control Operators, and I am convinced that most of you here in Saint Louis realize this. On several occasions we have had contact with some of your members, and our relations have been most friendly and congenial. We worked together in preventing the passage of a bill which was before the Missouri Legislature last spring, which would have been a hindrance to the Pest Control Operators in the State, as well as to our program. There are so many rats to eliminate, and bad conditions to improve, that I am sure all of the local operators and our Rat Control Program will be busy for a long time in our efforts to combat the rate menace.

As far as I can learn, the Rat-proofing of buildings has not been done by the Pest Control Operators. It would seem to me that this would offer him an opportunity for added service and profit, as well as satisfied clients. Surely it is far better and easier to KEEP the rats out of a building than to combat them, once they are established.

During the past year that we have carried on our dusting operations, ten months' actual working time, we have dusted approximately one hundred and seventy-five thousand burrows, averaging about eighteen thousand monthly. This in addition to the work done by our volunteers. Now you can figure out how many rats that equals. I am sure you can do this better than I could. Some of the blocks in the badly infested sections averaged over two hundred burrows to the block.

According to the United States Public Health Service the perfect pattern for a Rat Control Program should provide for the identification and classification of rodents and their ectoparasites. We have not yet reached that stage, as we are not equipped to handle these scientific phases.

Saint Louis has succeeded in ridding the city of the Smoke Evil, and I feel sure that the same spirit responsible for this wonderful improvement will be applied to the elimination of the rat menace, and that eventually we will have a cleaner, and consequently a more healthful, and beautiful city, and that reports of rat infestation will be the exception.

We feel that through the efforts of the Pest Control Operators and the Rat Control Program, people will become more conscious of the rat infestations, and the resulting damage to property, and that they will be more and more inclined to call on the Pest Control Operators for assistance, and by our combined efforts and cooperation we will finally achieve our goal, and add RAT CONTROL to our civic accomplishments.

## USE OF SODIUM CYANIDE IN FUMIGATION NOW PROHIBITED BY WPB

"Sodium Cyanide has again been placed on allocation [as of November 1, 1943] by the War Production Board, due to the great demand for metallic sodium for war purposes, which has had the effect of curtailing the manufacture of Sodium Cyanide," according to a recent issue of the Discoid News Bulletin. It is believed that the supplies of Sodium Cyanide which will be available from now on will be only sufficient to meet industrial needs, with no Sodium Cyanide to be sold or used for fumigating purposes.

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Good News

BUT DON'T ASSUME TOO MUCH

Recent events are leading everyone to visualize the end of the war, though with varying degrees of optimism. It probably isn't coming as soon as a lot of people have been hoping—but even when it does come it would be a mistake to assume it will be the end of the supply difficulty on pyrethrum and rotenone.

Military requirements for pyrethrum will continue heavy as long as we have troops in malarial areas, and post-war rehabilitation and disease control will require perhaps even larger amounts than are now being used. Any possible surplus during the next nine months will be badly needed by agriculture.

Rotenone supplies for 1944 are reasonably adequate, though far from ample. At best we shall have rotenone insecticides for most of the important food crops for which they are either essential or desirable, but there will be no surplus for less essential needs.

Manufacturers of household insecticides must plan on another season of getting along as best they can with substitutes.

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# Pest Control and The War Effort

*By* **PROF. J. J. DAVIS**, *Perdue University, Lafayette, Ind.*

*Delivered before the NPCA War Emergency Meeting, Hotel Statler, St. Louis, Missouri, October* 25, 1943.

COMPETENT AUTHORITIES have been emphatic in recognizing that insects are man's greatest competitors or enemies, even in peace times. During the present war, extending into tropical regions, insects are vastly more important and present grave threats to our foods and war materiels, to say nothing of their even greater importance as carriers of many human diseases. In other words Entomology is a science as important and critical as engineering, agriculture, medicine, chemistry, physics, bacteriology, or even military tactics themselves.

Perhaps we are all familiar with the major role played by insects in our war effort, but perhaps as an introduction to the program this afternoon it may be well to briefly enumerate the part they play in this gigantic struggle.

1. Food—Every growing plant has its insect enemies and we may say conservatively that insects consume perhaps 10% of our cultivated crops. And yet, perhaps 80% of this damage is preventable by known methods of control. Food producing animals are equally susceptible to losses and we need only mention such insects as flies, lice, bots and flesh flies, such as screw worms. The screw worms alone have been responsible for meat losses amounting to 10 millions of dollars in some year. The slogan "Food Will Win The War" is not an over-statement and one of our biggest problems in 1944 must be to reduce to a minimum these huge losses, estimated at around two billions of dollars.

2. Clothing Materials. Plant fiber, wood, and hides are almost as important as food and here again we have those pests which destroy our fiber plants, as the cotton boll weevil, parasites and flesh flies which cause severe losses to wool-producing animals, and the cattle grub or bot fly, which ruins millions of dollars of leather each year.

3. Stored Products. Even after food and clothing materials have been processed, we still have an insect hazard in the form of stored grain pests, as weevils, and clothing pests as clothes moths.

4. Annoying Insects. Some insects are simply annoying, and yet we know of insects being so annoying in defense plant areas as to seriously reduce efficiency in essential war work and even in training camps, such pests as chiggers have definitely interferred with extensive training programs.

5. But above all we have those many insects, hundreds, yes even thousands, which are directly or indirectly responsible for illness and death. Many insects carry dread diseases and as has been so aptly stated, insects may be responsible for more deaths of our fighting men than the bullets of our enemies. This is especially true in the major battle areas where such insect-borne diseases as typhus, trench fever, malaria, yellow fever, dengue, bubonic plague, dysentery, and many others are prevalent.

I have rather regular correspondence with some 40 Purdue entomology majors in the armed forces, here and abroad, and their words repeatedly emphasize the insect problems. Perhaps the most unfortunate part is that the Army in particular, and, of course, especially the Medical Corps, has not had the foresight to realize the need of trained entomologists. As a result many trained entomologists and pest control operators, as well, are not in branches of the service where they can serve to greatest advantage. Fortunately, the situation is changing and more and more the services of trained entomologists, and that includes trained PCOs is being recognized.

There is just one other point I would like to refer to before I introduce the first speaker, and that is the postwar insect problem. Only recently we read a notice of a serious outbreak of dengue fever, carried by mosquitoes, in Hawaii, apparently brought in by infected airmen returning from the Southwest Pacific area. With the return of Army and Navy personnel from these insect-borne disease areas of the tropics, we can anticipate the entry of many diseases heretofore of no importance in continental United States; likewise many plant and animal insect pests not heretofore established here. These post war problems are equally important to the present war insect problems and it will be well that we prepare now to fight the insect problems of the future.

Thus we find that on the home front the control of insects, and rodent pests as well, is a major problem to conserve food supplies and materiels, and to protect the health of our people engaged in the war effort; also that we must not lose sight of the post-war period, when insects may play an even greater role in our lives. You who are in commercial pest control work will be called upon to aid materially in the postwar insect problems and especially those which have a relation to human health, as well as those who may destroy our processed foods and clothing. In fact, I feel this is such an important problem that we anticipate including postwar problems in the program of the next pest control operators conference to be held at Purdue University in January.

## "It's Great to Be Home"

*By* **PRIVATE LONNIE BAKER**, *2nd Airdrome Squadron.*

When the sirens sound the last all clear,
And our job is finished over here;
There'll be a smile on every face
Cause our hopes are high to leave this place.
We'll go 'bout our work with a happy smile,
Cause then we know it won't be long
Till we'll be riding the salty foam,
Our job well done and we're going home.

When the roll is called of all our men,
There'll be a lot who won't fall in.
Their lives were lost for freedoms sake,
Thev were on the list for Him to take.
Until that day we've a lot to do
So come on boys, you, you and you
We'll help light the lights of every dome,
And until that day, we can't go home.

We'll go back to the folks, to Mom and Dad,
With memory of experiences that we had,
Of this area here in the Great Southwest,
Where we can't really say we had any rest,
And for the boys we had to leave over there,
In our hearts there will always be a prayer,
Then from Havana clear up to Nome,
You'll hear us say its great to be home.

*This poem was written somewhere in the Southwest Pacific.*

Copyrighted 1943 by Lonnie Baker.

## Eastern Branch, American Association of Economic Entomologists, Holds 15th Annual Meeting

Control of agricultural pests constituted chief topic of discussion at the 2-day meeting of the Eastern Branch, AAEE, held November 18-19 at the Bellevue-Stratford Hotel, Philadelphia, Pa. The meeting was attended by 150 entomologists, engineers, physicians, public health experts and PCOs from the North Atlantic States.

Of particular interest to the PCO was the Symposium on the Insecticide Situation which was the final session of the 2-day meeting, with Dr. Charles E. Palm presiding. Participating therein were: Friar Thompson, Hercules Powder Co., Inc., who discussed Thanite; Dr. Kerr, Naugatuck Oil Co., who discussed QTH Oil; Dr. Hammer, Dow Chemical Co., spoke on some of the new Di-Nitro dusts; and Dr. Maughn, Rohm & Haas, mentioned Lethane A-70 will soon be available in the form of a roach powder. S. A. Rohwer, Bureau of Entomology and Plant Quarantine, U.S.D.A., touched on some of the promising insecticides which the Bureau has been working on. He indicated added research essential on DDT with respect to its toxic effect and its insecticidal value. Neely Turner, Connecticut Agriculture Experiment Station, stated rotenone-Lethane mixtures have proved of value in extending supply of rotenone. J. L. Horsfall and C. C. Hamilton were also scheduled speakers in this Symposium.

# CRYOLITE

*By* J. O. BRUNTON, *Pennsylvania Salt Mfg. Co.*

CRYOLITE IS SERVING industry and agriculture in a variety of interesting ways, and is sometimes referred to as "The Miracle Mineral". The only known commercial deposit of natural cryolite is located at Ivigtut, Greenland.

About one week following the assassination of Lincoln, in 1865, the British brig, Ida, arrived in Philadelphia with the initial shipment of cryolite for the Pennsylvania Salt Manufacturing Company. It was originally imported for the production of soda ash, however, later developments showed there were more important uses for cryolite. Since 1865, Penn Salt has imported over a half million tons of cryolite.

Cryolite's most important use—particularly in wartime—is in the manufacture of metallic aluminum. It serves here as a flux of dissolving bauxite, the aluminum ore, which, without the fluxing aid of cryolite, melts at temperatures too high for practical materials of construction and operating conditions. In the presence of cryolite the bauxite fluxes at lower and more practical temperatures. Aluminum is separated from the molten mass by electrolysis. It is used as a bonding material in resinoid grinding wheels used to finish alloy steels on tanks, ships, and other fighting equipment.

In the glass, ceramic, and enamel industries, cryolite is used as a flux and opacifier. It performs an essential wartime service in the manufacture of glass containers for blood plasma. With cryolite, plasma glass can be made non-alkaline—a rigid and necessary requirement for this important use.

Food is as important to victory as guns—and here again this mineral is serving well. After special mechanical processing to separate the cryolite from impurities, it is micronized into particles of less than five microns diameter for use as a dust, spray, or bait to protect food crops from the ravages of many serious chewing insect pests.

The Pacific coast has been a leader in the use of cryolite as an insecticide followed by the gulf states. More recently the east and middle west have found definite places for cryolite in their pest control programs.

Time does not permit giving a detailed description of all the uses of cryolite as an insecticide. Its high margin of safety from injury to vegetation and fruits permits its use on a wide range of crops for control of some of our most serious chewing insect pests including—

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Cotton Bollworm on cotton
Cranberry Fruitworm, Blossom Worm, and Weevil on cranberries
Cucumber Beetles, Pickle Worm and Melon Worm on cucurbits
Loopers and Corn Earworm on lettuce
Pepper Weevil on peppers
Orange Worms on oranges
Grape Leaf Folder on grapes
Soybean Caterpillar on soybeans
Sugar Cane Borer on sugar cane
Tobacco Flea Beetles and Hornworms on tobacco
Tomato Fruitworm and Pinworm on tomatoes
Walnut Husk Fly on walnuts
White Fringed Beetle

(Continued on page 29)


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(1) Outgoing President Bohman turns gavel over to incoming President Elliott.

(2) The two gentlemen flanking President Bohman are not twins. Matter of act the one on the left is George R. Elliott, of Worcester, Mass., the other H. B. Ives, Rose Exterminating Co., Detroit, Mich.

(3) Acting on behalf of Association, Past-President "Doc" Steckel presents wrist-watch to President F. E. Bohman on the occasion of his retirement from office, while Morton Prescott, general convention chairman, beams approval.

(4) Galen C. Oderkirk, Fish and Wildlife Service, and William O. Buettner, Secretary NPCA, study chart of steps in program of rat control as practiced in Chicago's Cooperative Experiment, topic of Mr. Oderkirk's program talk.

(5) The ladies take time out for a picture.

(6) Happy but serious of mien, George R. Elliott acknowledges his unanimous election as president of the NPCA.

Camera: Charles Opitz.


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# "War On Mosquitos"

*By* **DR. LYLE D. GOODHUE,** ***Chemist, Bureau of Entomology and Plant Quarantine, U.S.D.A.***

*Text of Dr. Goodhue's address delivered Wednesday afternoon, November 17, 1943, at the New York Herald Tribune Forum on Current Problems at the Waldorf Astoria Hotel in New York. Dr. Goodhue's address was followed by a dinner given in his honor by S. B. Penick & Company of New York and among those present were representatives of companies actively engaged in the manufacture of the ingredients and containers for this outstanding weapon against malaria-carrying mosquitoes and other disease-carrying insects.—Ed.*

IN ALL THE WORLD the most important economic insects affecting man and animals are the mosquitoes. From the Arctic through the Tropics to the Antarctic almost two thousand species of mosquitoes thrive, with habits that adapt them to a wide variety of climatic conditions. Their annoying bite, which often spreads disease, places the mosquitoes among man's worst enemies.

The mosquito is principally an aquatic insect. Three stages of its life cycle are completed in the water and only one on land or, more correctly, in the air. The adult mosquito lays her eggs on or near the water, where they hatch and become swimming larvae, commonly called wigglers. In a few days they change to the pupal or transition stage while still living in the water, and soon the skin of the pupa splits open and an adult mosquito emerges. The remainder of this short life cycle is spent feeding, mating, and laying eggs to start the process anew.

Only the female mosquito has mouth parts that enable her to bite. The male, if he eats at all, must live on the nectar of flowers. In nearly all species of mosquitoes the female must obtain a blood meal from an animal or bird before she is able to lay her eggs. This necessity for the mosquito to bite is a scourge to the human race.

The bite of the mosquito alone is bad enough. It is not only annoying, but, if frequently repeated, the poisons that are injected and the loss of blood by the host may have serious consequences. In some parts of the world animals that are unable to protect themselves are often killed by the bites or even suffocated by the clouds of mosquitoes that swarm about them.

And as though all this were not bad enough, they add to their crimes by transmitting such dread disease as malaria, yellow fever, dengue, filariasis, and sleeping sickness as it occurs in the United States. Diseases carried by mosquitoes are confined principally to tropical and subtropical regions, but even in the United States malaria is prevalent all through the South and not infrequently breaks out in the Northern States.

The discoveries that malaria and yellow fever can be carried only by mosquitoes were outstanding events in medical history. Sir Ronald Ross in 1897 convicted the **Anopheles** mosquito of carrying malaria, and three years later Major Walter Reed placed the guilt for yellow fever on **Aedes aegypti.**

Although yellow fever is a highly fatal disease, a vaccine is available which gives good protection, whereas no method of immunization has been found for malaria. Certain chemicals, such as quinine and the recently developed atabrine, are specific against the malaria parasite in the blood, but they are not completely effective and the drugs themselves may have a detrimental effect.

(Continued on page 24)


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# RECENT DEVELOPMENTS IN ROACH CONTROL

(Continued from Page 13)

An article by Gahan (1942) on the killing power of 3, 5-dinitro-o-cresol has been widely quoted, but this chemical has several dangerous properties that make it unfit for use in roach control. The chemical is highly poisonous to man, stains hands, clothing and woodwork, and is explosive. It does have exceptional killing power, as in our tests a one per cent dust killed German roaches of both sexes in two to three hours.

The thiocyanate compounds have shown little value in tests reported to date. They are commonly used in fly sprays, either by themselves or to bolster a weak pyrethrum. In a dust form the extract has been added to a pyrethrum dust with fair success. Recently a new thiocyanate impregnated dust has been developed and is now under test. Preliminary results show that the material has a high toxicity to roaches, but causes severe nasal irritation.

The outstanding new material in our tests last winter was 2, 4-dinitroanisole. This was the only safe chemical tested that gave a kill as good as or better than sodium fluoride at all dilutions. For further testing six samples of this chemical diluted with either 80 or 90 per cent pyrophyllite were prepared and sent to some commercial operators. Of the six samples two were not used and a third was lost. The report from sample number 4 (10 per cent) stated that it stimulated the roaches as does pyrethrum, but had no knock-down effect. At the end of two weeks the kill was estimated at 70 per cent and a month later at 90 per cent, and was considered less effective than sodium fluoride. The report from sample number 5 tested in a brewery stated that there was a knock-down in five minutes and that an inspection made two weeks later reevaled one roach and a month later was still free. The report from sample number 6 stated that it "kills, but slow."

A further test of this material was made in Lafayette in a heavily infested apartment, where clusters of German roaches were found in the corners of the kitchen, in the cabinets and even in the curtains. The roaches were so numerous that fecal matter stained the cabinets, packages of food, and even the wallpaper. A 20 per cent mixture of the dinitroanisole was applied thoroughly about the kitchen and bathroom, and drove out of hiding hundreds of roaches. Two weeks later an inspection was made using pyrethrum to drive out the surviving roaches. It was estimated that the treatment had up to that time killed about 80 per cent of the roach population.

Dinitroanisole is a white, odorless chemical of rather large particle size. It is easily pulverized and at present sells for 65 cents a pound. Its toxicity to humans is not definitely known, but H. L. Haller (in corespondence, April 24, 1943) reports no skin irritation when used at a 2 per cent strength for a louse powder, while the manufacturer (Verona Chemical Co.) states that if the organic chlorine is less than 0.01 per cent, it is safe for external use. J. C. Ward of the U. S. Department of Interior Wildlife Research Laboratory (in correspondence May 28, 1943, and September 21, 1943) tested this material on white rats and found that its relative toxicity to rats was extremely low.

A number of other organic chemicals were tried in the laboratory on the German roach. The following chemicals showed some toxicity: acetonesemicarbazone, azoxybenzene, a-nitronaphthalene, phenothioxin, hydrazobenzene and diphenylene oxide. Most of these chemicals had some drawback, such as unavailability, high price, low toxicity or unpleasant odor, that would prevent their use in roach control.

### Activators and Extenders

Many commercial men have been trying to make present supplies of pyrethrum and sodium fluoride go further by reducing the amount of each in mixtures. Mixtures containing as little as 35 per cent sodium fluoride and 20 per cent of good pyrethrum have given good results. Recent information on the pyrethrum supply indicates that none will be issued for civilian use in the next year. Spent pyrethrum, sometimes called marc, has been suggested for roach control. Recently a sample reported to contain 0.15 per cent pyrethrins was tested against the German roach and was found to have low toxicity. When this material was fortified with certain other extracts, the toxicity was still rather low. In previous tests a dust made from a high grade pyrethrum and containing only 0.025 per cent pyrethrins gave a better kill than the spent pyrethrum.

Several workers have mentioned the synergistic effect pyrethrum has on sodium fluordie when the two were used in a mixture. In our tests a mixture of 5 per cent sodium fluoride with pyrophyllite gave a 65 per cent kill of German males and a 20 per cent kill of females, while 5 per cent pyrethrum (0.025 per cent pyrethrins) in pyrophyllite gave an 88 and 30 per cent kill, respectively. When 5 per cent of each material was mixed with pyrophyllite, the kill was 100 and 90 per cent. The spend pyrethrum added to sodium fluoride would probably give good results although tests of this mixture are still in progress.

Marcovitch & Stanley (1942) state that an acid type of dextrine exerts a synergistic effect upon the combination of pyrethrum and sodium fluoride. They have recently patented a mixture containing 10 per cent each of these materials and 80 per cent of an acid type of dextrine.

Starch has also been used, apparently with good results, as a diluent by some commercial operators. Although starches vary greatly in particle size and adhesiveness, a finely ground material should aid in sticking a dust mixture to walls and other surfaces and to roaches. In our tests three samples of starch and four samples of an acid type of dextrine were compared with pyrophyllite as a carrier of insecticides. The results indicate that no diluent was consistently better with all four insecticides and that none showed any appreciable activating effect.

A recently patented idea (Hutzel, 1943) for making sodium fluoride go further is the use of sodium fluoride crayons. The poison is mixed with water, pressed into crayons under high pressure and then baked. It is claimed that a line drawn on a wall with the crayon is sufficient to kill roaches crossing it.

F. L. Campbell at these meetings last year suggested that sodium fluoride could be made to go further by suspending it in a liquid and spraying it into hiding places. He mentioned no liquid carrier and so many PCOs have been experimenting with various materials. Max Levenson reports good success with sodium fluoride suspended in a light oil and applied with a pump oil can.

### Baits

Of all the baits proposed for the control of roaches, only phosphorus paste is completely effective and even then only on the larger species of roaches. The American and Oriental are strongly attracted to phosphorus paste and are readily controlled by that means.

Many combinations of traps, baits and poisons have been offered on the market, but none have met with complete approval of commercial operators. Recently several new traps and baits have been manufactured, but little is known about their effectiveness as yet. The German roach is not attracted to phosphorus paste and eats sparingly of it. So far no one has found a food, odor or poison that will attract this species sufficiently to give it a lethal dose.

### Summary

The shortages of sodium fluoride and pyrethrum have made a number of changes necessary in the usual methods of controlling cockroaches, especially the German roach. As long as supplies of these two materials are available, they can be made to go further by reducing the content of active ingredients in the mixture and by applying the materials carefully and thoroughly. A mixture containing 15 to 20 per cent pyrethrum (of 0.9 per cent pyrethrin content) and 40 to 50 per cent sodium fluoride has given excellent control.

Before control measures are applied in an infested premise, the building should be thoroughly examined to determine the hiding places of the roaches, their sources of food and water, and possibly the source of infestation. Certain changes to improve the sanitation of the building, such as the daily removal of garbage, the cleaning of incinerators, the proper storage of food products, the elimination of moisture, and the filling of cracks around the floor, will greatly aid in reducing the attractiveness of the premise to roaches. An understanding of the roach problem in the building will greatly simplify the treatment, and will permit a better control with less material.

Of the many substitute materials tested to repalce sodium fluoride, the most practical at the present time is the new fluffy sodium silicofluoride. This material is plentiful and has given excellent results in the control of the German roach. One objection to this chemical is the severe nasal irritation caused to the operator.

In locations where non-poisonous materials must be used, many PCOs have substituted boric acid and borax for pyrethrum. Experimental results with these materials show varying results in the tests of various research workers. Boric acid is undoubtedly more toxic to roaches than borax, but still requires about 10 days in the laboratory to obtain a satisfactory kill. The use of a boric acid solution in vials scattered about a premise has been suggested by Barnhart, but a number of vials must be used, as roaches are not attracted to them.

A new thiocyanate dust has given excellent results in the control of roaches, but is so irritating that it cannot be used in its present form.

Of the many new chemicals tested in our experiments, only 2, 4-dinitroanisole proved practical. In the laboratory this material killed roaches at a lower dilution and in a shorter time than did sodium fluoride. In practical tests with this material the elimination of roaches was slow but effective. Information available at present indicates that this chemical has little or no toxicity to humans. Dinitroanisole shows promise as a roach poison and is worthy of further trial under practical conditions by the PCO.

The particle size of an insecticide is an important factor in its effectiveness. For example, the fluffy sodium silicofluoride, which measures 4 to 8 microns in size, gave an excellent kill, while the coarse powder gave only partial control. The fineness of the particles is especially important with boric acid and borax.

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## Fourth Annual Eastern Pest Control Operators' Conference

(Continued from page 16)

reservations be made as early as possible to secure the accommodations desired. We cannot over-emphasize the importance of your doing this because there are other special courses conducted during the war emergency which tax the facilities of the hotels.

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## "War On Mosquitos"

(Continued from Page 21)

Because malaria is endemic in many parts of the world, and is difficult to control, it is the number-one military disease. The malaria incidence will depend, of course, on the location of the fighting area, but in this war our greatest activities thus far have been under the worst malarial conditions. In India alone there are approximately 100 million civil cases, with a million deaths every year. During the last World War entire armies were immobilized because of malaria. In Macedonia it prevented German and Allied armies from moving against each other for three years. The acute and chronic cases of malaria accounted for many more casualties than bullets, where campaigns were carried out under malarial conditions.

A mosquito is unable to transmit malaria until about 2 weeks after biting a malarial patient. Recent experiments in India by Col. P. A. Russell demonstrate that this disease can be almost eradicated by systematic and persistent killing of adult mosquitoes in populated places where they have been in contact with active cases of malaria. Every village hut was thoroughly sprayed once each week to kill the infected mosquitoes before they were able to transmit the disease. This method of controlling malaria attaches new importance to the killing of adult mosquitoes.

In this war new methods for the control of malaria by attacking the carrier of the disease are available. One of the most important weapons is the aerosol developed by the Bureau of Entomology and Plant Quarantine in the United States Department of Agriculture. This new material is so effective that 5 milligrams, one very small drop, of the active principle will kill all the mosquitoes in a small room, say about 1,000 cubic feet, when they are exposed for only one minute. Although extremely deadly to mosquitoes, it is not poisonous to man and animals. It is non-flammable and requires no separate spray equipment.

In January 1941 two of us in the Bureau of Entomology and Plant Quarantine, W. N. Sullivan and I, began work on this new method of applying insecticides. We started with the idea of suspending the insecticide in the air without liquid carriers. These suspensions were called insecticidal aerosols, because "aerosol" is the scientific term for a smoke or fog. Many methods of producing aerosols are known. Several of these were tried, but all were discarded except the one which employs the energy stored in a liquefied gas.

By this method the insecticide dissolved in the liquefied gas is confined in cylinders, similar to those commonly used for liquid carbon dioxide or other compressed gases. To make the aerosol it is only necessary to open a valve and allow the solution to be expelled by its own pressure through a small orifice into the atmosphere. Once out in the air, the liquid boils violently and disperses the insecticide as a floating mist. This mist travels on the air to seek out and kill the deadly mosquitoes, whether they are flying or hiding in some nook or cranny.

The research on this insecticide did not come to a dramatic conclusion after numerous failures. The very first attempt was successful. Subsequent research led to minor improvements, but the tremendous quantities that have already been used by our fighting men contained the same ingredients that were in the first solution prepared. The combination used to produce the aerosol consists of pyrethrum and sesame oil dissolved in liquid dichlorodiflouromethane, a synthetic chemical known commercially as Freon. All these materials have been known to the world for many years, but the combination has produced a revolutionary method of applying insecticides. It has promise of replacing the oil-base insect sprays for many purposes. One pound of the aerosol-producing solution is more effective than 2 gallons of the old-type fly spray.

After a few demonstrations by us the Army became interested. This insecticide was exactly the weapon they needed to wage their war against mosquitoes. However, the experimental equipment used in our laboratories was not suitable for the field. From then on, the use of the aerosol became a container problem. Such a container must be small enough for individual issue, simple to use, safe, and free from trouble. To solve this problem a number of concerns specializing in liquefied gases were called in by the Army and the Bureau. One large electrical company in a short time developed a small combination container and discharging apparatus which was acceptable to the Army. Acceptable containers are also produced by three other companies.

The most commonly used dispenser holds about 1 pint. It is stamped from sheet iron and brazed to from a gas-tight container. A very fine capillary tube runs the length of the container on the inside, extends out through a threaded portion at the top for about 2 inches, and is sealed at the end. Before the container is opened it is held in an inverted position and this tube, which looks like a wire, is broken off. No insecticide is expelled until the dispensor is returned to an upright position. A cap is provided to stop the flow of the liquid after the seal is broken.

The aerosol in these containers is the insecticide recommended for use on all military airplanes to prevent the spread of disease-carrying insects. It is particularly well adapted for the control of mosquitoes in many combat areas.

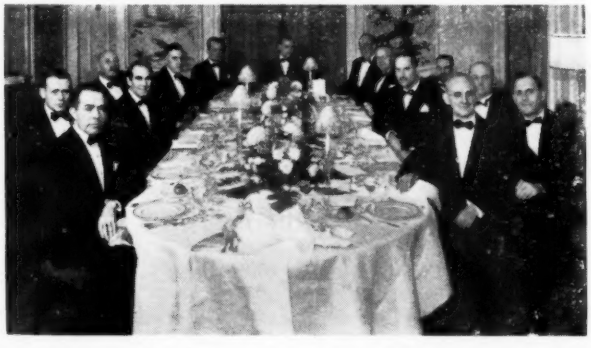
Many insect-killing materials other than pyrethrum have been tested in aerosol form. Among the most promising is a chlorinated diphenylethane commonly called DDT. It is unusually destructive to house flies and very effective against many other insects.

In the war on our enemy, the mosquito, the aerosol has another use. During its life in the water the anopheline mosquito is very vulnerable. Small amounts of insecticide scattered over the water's surface poison and kill the larvae and other aquatic forms. Paris green was formerly the best larvicide for this purpose, but several new, many times more powerful materials, are now available which can be applied by the aerosol method. Like pyrethrum in Freon, these materials can be dissolved in a similar liquefied gas, methyl chloride, and sprayed out over the water. This can be done from an airplane or by boat, or by walking along the windward side of the body of water to be treated. This unique method of attack is a valuable supplement to drainage and other control procedures and is especially applicable to the use by armies on the march in malarious countries.

The war on mosquitoes is carried still further by applying repellent chemicals to the clothing and skin. The Orlando, Florida, laboratory of the Bureau of Entomology and Plant Quarantine has found that certain mixtures will protect against biting for several hours.

In general, our progress in the control of mosquitoes has been good, but research still continues, bringing with it the advances necessary to meet each new situation. In war or peace the fight against mosquitoes must go on.

In closing I might say that aerosols are effective against houseflies, gnats, ants, wasps, fleas, and many other insects, besides mosquitoes. Although the aerosol is not available for civilians at present, in the opinion of many it will enjoy a wide use by the public after the war. Many different insecticides for different insects can be applied by this method. We believe the future will bring special "bombs" filled with moth eradicators for the clothes closet, with insecticides for the greenhouse or garden, and special preparations for agricultural purposes.



DINNER IN HONOR OF LYLE D. GOODHUE, Ph.D., Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, given by S. B. Penick & Company, New York, at the Waldorf Astoria Hotel, Wednesday, November 17, 1943.

## Invalid Cat, Rat, Are Fast Friends

LOS ANGELES.—A veterinarian, Dr. J. E. Hapenny was treating a mother cat, Alice, for an ailment after she had lost all her kittens but one.

A small boy brought his baby white rat, Oscar, to Dr. Hapenny suffering from a broken leg.

Cat and rat got acquainted during convalescence, and the attachment progressed to the point where now Alice treats Oscar and her kitten impartially when mealtime rolls around.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**Wizo Rat Glue Boards**

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**One gross lots, $35.00**

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# LOCAL ORGANIZATION NEWS

## Important Changes to the State Structural Pest Control Law to Be Discussed at the Coming Pest Control Operators' Conference to Be Held in Los Angeles the Early Part of February, 1944.

The following changes to the present State Structural Pest Control Law have been submitted to the Legislative Committee of which David G. Rennie of Los Angeles is chairman. Comments and additional changes should be forwarded to the chairman immediately so that the committee will have time to accumulate all necessary data to present to the industry at the coming conference.

1. That, the "Structural Pest Control Field Representative" as now defined in Section 8507, page 3, be deleted from the present law and all reference clauses contained therein.

2. That, a new section be inserted known as "Divisions of Structural Pest Control." That Structural Pest Control be divided into three well defined classifications known as: (a) Termite Division; (b) General Pest Control Division; and (c) Fumigation Division. These divisions to be made for the proper enforcement and clarification of the act.

3. That, Section 8521—Board Members: to be changed so that all five members are pest control operators actively engaged in the business of pest control for a period of not less than five years preceding the date of their appointment.

4. That, Section 8569—Licenses for active partner—be clarified so that each partner would have the same benefit as the individual operator.

5. That, Section 8674—Schedule of fees—be changed to allow for separate prescribed fees for each Division of Structural Pest Control as outlined in No. 2 above.

—*PCO News.*

## Connecticut Pest Control Association Elects

At the annual meeting of the CPCA held on the evening of Nov. 15, 1943 at the office of the Aetna Exterminating Co., Hartford, Conn., the following officers were elected: Oscar Anderson, President; Lester Bureau, Secretary and Treasurer. At the conclusion of the business meeting all repaired to the home of Mr. Anderson in Cromwell for dinner which was delightfully served by Mrs. Anderson and her sister.

## Pest Control War Emergency Conference to Be Held In Los Angeles

Due to wartime conditions, preliminary plans are now being developed for uniting of the pest control conventions and conferences in one large War Emergency Conference, to be held in Los Angeles in February of 1944. The exact time and place for holding of this conference have not been definitely decided upon as yet but will be announced in an early issue.

The theme of the conference is "Pest Control During Wartime." Several noted entomologists and health authorities have already been listed to appear on the program, their subjects to be announced in the program in a later issue.

## George R. Elliott and William O. Buettner Address Joint Meeting N. Y. Pest Control Association and Professional Exterminators Association, November 8, 1943.

Speaking before a joint meeting of the NYPCA and the PEA at the Hotel Commodore, N. Y., George R. Elliott, newly elected president of the NPCA, covered matters of immediate and postwar concern to the PCO. Some of the thoughts he advanced were:

1. That since the war emergency had created such close ties between the U. S. and Canada, which would carry over into the postwar period, he preferred to think in terms of an American Pest Control Association rather than a National Pest Control Association.

2. That the PCO has an opportunity to add another or fifth freedom to the "Four Freedoms," namely "Freedom from Pests," which he advocated is an effective slogan for the Industry.

3. That on his return to civilian life the army-trained PCO would provide added competition for the civilian PCO, though he did not believe it would be of serious consequence, in fact, he thought it might even prove a stimulant.

4. That the Industry must educate itself since requisite educational facilities not available from other sources.

5. That the PCO should make every effort to attend forthcoming regional conferences.

There were over 50 present when Chairman Joe Finneman introduced George Elliott as the first speaker of the evening.

Irving Sameth, past president of the NPCA, urged PCOs from Greater New York area to attend Chicago convention in '44. Sidney Wimmer, in commenting on War Emergency Meeting, declared importance of industry was reflected by the prominent panel of speakers on the program; while Dr. A. L. Brody praised excellent attendance at the various sessions. Edward N. Goldey, who was described by Chairman Finneman as "always running into a meeting on his way out," commended the Industry for its growing scientific approach to problems and declared importance of Industry was emphasized at the War Emergency Meeting.

Mr. Finneman characterized his introduction of William O. Buettner as "something akin to lighting a match to a firecracker" and, needless to say, Bill did not disapopint. Highlights among the topics he discussed were: New union contract . . . Coming professional status of the industry . . . Possibility of university courses on structural pest control and building to be devoted to structural pest control in project after the war at Cornell University . . . George R. Elliott's behind-the-scene activities on behalf of the Industry . . . Charles Pomerantz's outstanding book on ticks which when published will be the first by a PCO . . . Improved standards or specifications for various pest control services, with distinct possibility that Good Domestic Fumigation Practices will find their way into city and state laws . . . Degree for members of profession on way . . . Washington trip . . . Sodium cyanide, rubber bellows and red squill supply situation . . . Possibility of increased dues for NPCA after January first and advisability of joining before then since increase would not be retroactive . . . Life Magazine's interest in writing story about Industry. Question-and-answer period followed.

After Mr. Sameth's motion that the NYPCA purchase $2,000 worth of War Bonds was unanimously carried, the meeting adjourned.

Those in attendance at the joint meeting of the Professional Exterminators Association, Incorporated and the New York Pest Control Association, Monday evening, November 8, 1943:

Philip Haller, Jr., Virus Limited.
William J. Shrimplin, Rose Exterminator Co.
Theodore Schmerl, Disinfecting & Exterminating Corp.
Irving H. Drucker, Banex Exterminating Co.
Arthur Louis Brody, Pioneer Exterminating Co.
William Reimer, Century Exterminating Co.
Morris Feldman, Columbia Exterminating Co.
Jacklyn Farrell, Effective Exterminating Co.
William Farrell, Effective Exterminating Co.
David Cantor, Bell Exterminating Co., Inc.
Philip Mayer, Evins Exterminating Co.
Charles Pomarantz, Bell Exterminating Co.
Henry Edelson, O. K. Exterminators.
H. A. Plaugh, Affiliated Exterminators.
H. Kruse, Metropolitan V. E. Co.
M. H. Oachs, Ozane Co.
M. Levine, A. D. Exterminating Co.
Jacques Hess, Exterminating Services Corp.
Chetser Schwimmer, Fumex Sanitation, Inc.
S. Wimmer, Majestic Exterminating Co.
H. S. Bussell, Bussell Exterminating Co.
Jack Yaro, Presto Exterminating Co.
Norman Lieberman, Thoro Exterminating Co.
A. H. Montag, W. J. Parker, Inc.
A. W. O'Connor, Security Exterminating Corp.
Raymond J. Kelley, Paramount Exterminating Co.
Stefan M. Rohdie, Excelsior Exterminating Co.
David A. Weisburger, B. & D. A. Weisburger.
H. G. I. Sameth, Sameth Exterminating Co.
Max Rosenthal, Pests Magazine.
M. E. Blinder, Josephson Dis. Co., Inc.
I. Snyder, Oriental Exterminating Corp.
Justin Simon, General Exterminating Corp.
Alice T. Billings, Steamship Sanitation Co., Inc.
E. N. Goldey, Bliss Exterminator Co., Inc.
G. E. Bloch, Brooklyn Exterminating Corp.
A. M. Weiss, All Westchester Exter. Corp.
N. Harvey, Town Exterminating & Chemical Co.
George R. Elliott, President, National Pest Control Assn.
Joseph Finneman, Pest Control Corp.
Thomas H. Mahon, Asst. Secretary, NPCA.
W. O. Buettner, Buettner Pest Control Co.
Murray Gladstone, Abbott-Madison Exterminating Co.
Jack Huberman, A. Scientific Exterminating Co.
Harry Rosenfeld, Worldwide Exterminating Co.

## Philadelphia PCO's Meet

Taking advantage of the Eastern Branch Meetings of the American Association of Economic Entomologists that were held in Philadelphia, Pa. last month, members of the NPCA met with Secretary Bill Buettner at a dinner meeting at the Bellevue-Stratford on November 18th. The absorbing discussions had to do with problems confronting the industry with emphasis on shortages of chemicals and supplies.

Among those in attendance were: John G. Vogel, D. M. Weisen, J. A. Jett, Martin T. Meyer, L. P. Reichel, Walter Cholerton, W. C. Sharp, John Kavanaugh and York A. King.

## New England Pest Control Association

After F. E. Bohman, George R. Elliott and William O. Buettner spent the morning of November 22nd at Massachusetts State College in discussing plans for the Fourth Annual Eastern Pest Control Operators Conference to be held January 10-11-12, the trio journeyed to Boston, Mass. to participate in the regular meeting of the New England Pest Control Association held at the Parker House in Boston, Mass. the same evening.

# WHAT'S NEW IN PEST CONTROL-PERSONALS

W. R. WARTHEN has been appointed manager of Vogel-Ritt of Ohio, Inc., Cincinnati, O., succeeding Charles Cushing who has joined the U. S. Coast Guard and is stationed at Sheepshead Bay Coast Guard Training Station, Brooklyn, N. Y.

DR. E. N. WOODBURY has been appointed assistant to Friar M. Thompson, Hercules Powder Co. entomologist, according to a company announcement. He will work especially on Thanite and other synthetic agents for insecticides. Prior to his new appointment, Dr. Woodbury, who is a graduate of Ohio Wesleyan and Ohio State Universities, was connected with the Crop Protection Institute of Pennsylvania State College, and for two years held the NAIDM's fellowship.

**Warren H. Moyer** resigned as chief of Insecticide and Fungicide Unit of WPB, but continues in advisory capacity; succeeded by John A. Rodda, who has been acting chief.

**Prentiss M. Brown** resigned as OPA administrator. Chester Bowles, general manager, nominated to succeed him.

**Dr. E. R. DeOng,** former secretary Pacific Insecticide Institute, has joined the OPA staff in Washington.

**Dr. George F. MacLeod,** entomologist, University of California, joining WFA staff in Washington.

JOHN G. VOGEL, Vogel-Ritt, Inc., Philadelphia, Pa., sends us an interesting poem which appeared in a recent news letter of the Lions Club of West Philadelphia, Pa.:

Among this morning's mail I found
A Picture Postal Card,
The type that many people get,
Glance at, and then discard.
If I would toss this one away
I might forget to mention
John Vogel sends his best regards
From the **Pest Control Convention.**
St. **Louis** won the chance to house
This Anti-Vermin bunch
Who try to sneak up on a roach
And steal away its lunch.
Who ever thought that **Pest Control**
Would reach a National scope
And men would meet to plan a war
On rats and bugs with dope.

Incidentally, Mr. Vogel has been a "Lion" for a number of years and a past president of the West Philadelphia unit . . . And speaking of the Lions Club we understand George R. Elliott and William O. Buettner were guests of Calvert Cissel at the regular meeting of the Bethesda-Chase Lions' Club (Washington) on Tuesday evening, November 9. We don't know what the two past presidents of the NPCA and President Elliott talked about that evening, but could it have been Association matters?

TOTAL ANNUAL DAMAGE to our food supply through the attacks of insects and rodents runs to approximately two billion dollars, according to a statement by Virginia A. Fairfield, Food Distribution Administration, Washington, D. C. The estimated loss is approximately 6 to 7% of our total available food, or approximately the amount we lend-leased to all our allies last year. Pest control through intelligent and repeated use of insecticides is thus more important than ever as a war-time necessity. The ten leading insects from the standpoint of the damage they cause are the boll weevil, corn ear-worm, housefly, rice weevil, cattle grub, coddling moth, Colorado potato beetle, Hessian fly, cotton flea hopper, and the chinch bug, says Miss Fairfield.

THE EARLIEST REPORT probably of the use of white hellebore as an insecticide, states Dr. P. P. Pirone, associate plant pathologist, Rutgers University, was made by Pliny, writer who lived during the days of the Roman Empire, and who observed that flies could be destroyed by permitting them to feed on a mixture of powdered white hellebore and milk.

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Brief messages were brought by President Elliott of the NPCA and Pete Bohman who outlined the advantages of the forthcoming Eastern PCO Conference. There followed remarks by Lt. Donald DeLeon, Sanitary Corps, First Service Command; Prof. Charles H. Blake, Massachusetts Institute of Technology; Bartlett W. Eldredge and William O. Buettner, Secretary of the National Pest Control Association.

Lester West presided in the absence of Mark Weintraub, President, to whom was expressed the sincere sympathies of the Association because of funeral of Mrs. Weintraub's father. Election of officers also took place for the ensuing year. Mark Weintraub, President; Lester West, Vice-President; Thomas Sheehan, Secretary and Bartlett W. Eldredge, Treasurer.

Those in attendance at the meeting held in Boston, Mass., Monday evening, November 22nd, 1943:

J. Neuman, Neuman Chemical & Ext. Co.
Lt. Donald DeLeon, Sanitary Corps, U. S. Army.
Charles H. Blake, Massachusetts Institute of Technology.
Ken Cook, Ransford Insecticide Co.
Roland M. Cook, Ransford Insecticide Co.
Joseph Fleischer, Astor Exterminating Co.
Louis Weintraub, Astor Exterminating Co.
F. E. Bohman, Birchard System.
Peter DeSilva, Bay State Pest Control.
W. D. Starbird, Puritan Specialty Co.
H. Harris, Jr., S. B. Penick & Co.
Raymond H. Bigelow, Astor Exterminating Company.
A. Kaplan, New England Exterminating Co.
M. E. Robbins, Ace Sanitation System.
A. Bain, New England Exterminating & Fumigating Co.
C. A. Chafe, C. A. Chafe Co.
C. H. Corey, Waltham Chemical Co.
George R. Elliott, Ransford Insecticide Co.
Bartlett W. Eldredge, Waltham Chemical Co.
Charles W. Houghton, Safety Fumigant Co.
David A. Weisburger, B. & D. A. Weisburger.
J. Harrie Burdge, Raymond, Maine.
C. S. Maguire, William A. Maquire Co.
A. N. Dangerfield, William A. Maguire Co.
Lester M. West, Rose Exterminator Co.
C. J. Hackley, Mattapan Insecticide Co.
S. H. Horrison, Mattapan Insecticide Co.
William O. Buettner, Secretary, National Pest Control Association, Inc.
T. A. Sheehan, Paramount Laboratories.
H. D. Lockhart.


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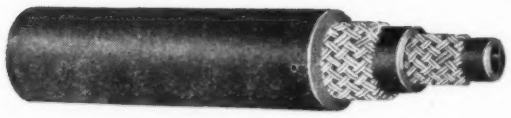

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**529 East Broadway Louisville, Ky.**

# EVALUATION of ORGANIZATION and MEASURES for RAT CONTROL

(Continued from page 11)

record cards are being used in projects now under way. At the same time that this survey is being made, the garbage disposal and harborage removal unit can be instituting in the zone universal use of proper containers for refuse and garbage, and enforcing the removal of debris with orderly storage of materials to prevent the formation of rat harbors. Methods for doing these things are described in U. S. Fish and Wildlife Service Conservation Bulletin 8, and other publications.

After these control measures are under way, the vent stoppage and ratproofing sections may start closing the openings into the buildings and making such inside alterations as are necessary to stop rats from traveling about. Methods for doing these things are suggested in U. S. Public Health Service Supplement No. 131, pages 27 to 62; U. S. Public Health Reports, Vol. 58, No. 22, May 28, 1943, pages 825 to 832, and Fish and Wildlife Service Conservation Bulletin 19.

The reduction of rat populations may start before the vent stoppage operations or may follow them, as best suits the program. If it precedes vent stoppage, it is necessary to inspect the buildings after they are repaired in order to remove any rats that may have escaped reduction methods and were shut in a building by the vent stoppage work. Consequently, it may be better to delay the elimination work until after the ratproofing operations.

Reduction of the rat populations by means of trapping, fumigating, and poisoning may be done by the property owners or occupiers under the direction of the regular force of the rat control organization, or by local commercial pest control operators who can time their operations in line with the rat control program. Public buildings and any remaining properties may be treated by the official crews of the rat control organization. Directions for trapping, fumigating and poisoning are given in the publications previously mentioned in this paper, particularly Conservation Bulletin 8. Experience has taught operators that total extermination of rats cannot be expected from the use of one method alone. Trapping is slower and more expensive than poisoning, yet may be indispensable as a follow-up procedure. There may be live rats by either method alone, while by a combination of the two, elimination may be complete. Fumigation is more limited in its use but is very effective.

Wary rats sometimes test the ingenuity of operators, making it necessary to employ various special methods. Good operators generally have a bag of tricks ready for such wise ones. Prebaiting, that is, distributing a bait material that is not poisoned until the rats are taking it well, and then mixing a poison with this bait material and distributing it in the same locations, is often very effective. Trapping is more difficult when plenty of food is available, but even then it is not necessarily hopeless. Baiting of traps is important under such conditions and baits may have to be changed frequently until the rats are attracted. Fresh coconut meat and peanut butter have proved very attractive baits for traps.

Plaster paris is recommended for use in bait materials in some publications, but experiments with this material so used have failed to kill any rats. Plaster paris (calcium sulphate) is insoluble in water, but the acid in the gastric juice likely changes it into a soluble compound which is obsorbed or does not harden in the digestive tract so as to form an obstruction.

Rat control operators generally have found poisoning to be the least expensive method of removing the rats, and its efficiency is not doubted. Much progress recently has been made in finding materials for baits and in developing new toxic substances of metallic or organic origin. Some new synthetic compounds are proving to be very toxic to the common Norway rat but their practical uses are still under consideration. The two main factors considered as disadvantages in the use of poisons are the danger of accidental poisoning to human beings and domestic animals and the offensive odor occasionally produced in buildings by decaying rat carcasses. In regard to the first, the danger is very slight when the poisoning is done by experienced operators, the records show that very few such accidents have occurred. Operators report the percentage of buildings that have been treated with poison baits for rats in which offensive odor has been caused, is only about 5 per cent, that is, one in twenty. In the majority of these, deodorants will overcome the objectionable smell.

The organization for cities with fewer than 150,000 inhabitants may be similar to that which has been described, although less extensive. The advisory committee may or may not be feasible. There would not be the need for as many assistants to the superintendent. The general plan of action, however, may be the same.

In rural areas using the county as the unit, rat control organization may be set up through the county agent's office, county health units, or similar agencies. In many counties there are already rodent control committees functioning through the county agent's office and some rat control work is being conducted through these. This work could in some instances be made more lasting and effective if an assistant were employed especially for rat control work, who would conduct a thoroughly organized program.

## SUMMARY

A. City Rat Control Organization Chart
   I. Advisory Rat Control Committee
      A. Director of City Health Department
         a. Superintendent of Rat Control
            1. Educational division—conducted by the superintendent working through radio stations, newspapers, schools, citizens associations, and special schools for rodent control
            2. Surveys division—conducted by an assistant to the superintendent and aided by assistant inspectors
            3. Garbage disposal and harborage removal division —conducted by City Health Department inspectors, working with other city departments, with citizen associations, and with individual citizens.
            4. Vent stoppage and ratproofing division — conducted by an assistant to superintendent working with property owners or occupiers, contractors, and laborers.
            5. Reduction of rat population division—conducted by an assistant to the superintendent, with trained crews working with property owners or occupiers, commercial pest control operators, and citizens associations.

B. Procedure in Control Methods
   1. Surveys of rat conditions should be made first in order to plan the methods of control to employ and the procedure to follow.
   2. The city should be divided into zones suitable for effective work.
   3. A combination of control methods should be used because no one method is sufficiently effective.
   4. The most effective rat reduction methods should be used along with those designed to prevent the building up of a rat population.
   4. For large scale control operations, poisoning and fumigation should first be used along with preventive measures, followed by trapping and special methods to complete control.

*Senior Biologist, Fish and Wildlife Service, United States Department of the Interior, Chicago, Illinois.

## CRYOLITE

(Continued from Page 19)

There is no record to justify the classification of natural cryolite as an acutely toxic substance to human beings or animals. Fluorine is present in sodium fluoaluminate in a relatively insoluble form as compared to the more soluble fluorides. In over 75 years of working with cryolite we have experienced no difficulty with regard to any toxic effect upon workers in daily contact with the material. There is no record in the literature of a fatality to either human beings or livestock as a result of cryolite poisoning. The forced feeding of natural cryolite to livestock in large quantities has not resulted in fatality.

It is to be hoped that investigational work now in progress on the toxicity of cryolite to human beings at one of the nation's leading medical schools and laboratory of applied physiology will result in a more liberal spray residue tolerance, and in the complete removal of cryolite from the acutely toxic classification. A few states at this time do not differentiate between the insoluble and highly soluble fluorine insecticides.

The Victory garden demand for cryolite has been excellent and we are going to have available mixed cryolite dusts in small packages in addition to the concentrated material.

This year we doubled our production facilities and ample stocks of cryolite insecticide were available at all times. The use of cryolite greatly increased and the reports of results obtained in the field were certainly gratifying.

The outlook for 1944 is excellent. We have a large stock-pile of both the ore and refined product, and can take care of any anticipated demand. The use of cryolite as an insecticide in 1944 will reach from Canada to South Africa, and even in far off Espirito Santo, West Samoa, and Guadalcanal, farmers will be employing cryolite in their battle against insects.

## Typogremlins

The typographical error is a slippery thing and sly;
You can hunt until you're crazy, but it somehow will get by.
Till the forms are off the presses, it is strange how still it keeps;
It shrinks into a corner, and it never stirs or peeps,
That typographical error, too small for human eyes
Till the ink is on the paper, then it grows to monstrous size.
The boss he stares with horror, then he grabs his head and groans.
The copy reader drops his head upon his hands and moans.
The remainder of the issue may be clean as clean can be . . .
But that typographical error is the only thing you see.

*—Author Unknown.*

## "AIN'T IT THE TRUTH"

### ABSOLVES TERMITES OF BLAME IN HOUSE COLLAPSE

Termites were absolved from blame for the almost complete destruction of the John Norcia five-room house at 1482 El Sereno Avenue, Pasadena, Calif., Superintendent of Building Walter Putnam reported.

Mr. Putnam inspected the house which the day before had tumbled off its foundation. The house was at least three feet away from its original mooring, he said.

The jolt had not only brought plaster down in great chunks but had warped the floors and had broken all pipes. Mr. Putnam stated that the house is in such a sad state that the owner will be unable to make it livable unless he obtains special permission from the government for building materials.

The collapse of the foundation, at first diagnosed as the result of termites, was due entirely to dry rot, Mr. Putnam said.

*—PCO News.*


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**FOR RATS AND MICE**

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Per-Mo Rat and Mice Exterminating Liquid can be used as a drink or can be mixed with any food and used as a bait.

Economical to use and a "Guaranteed" Rodent Exterminator.

Send $1.00 for a 16-oz. Bottle CONCENTRATE RAT & MICE EXTERMINATING LIQUID. Postage Prepaid.

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3729 Virginia Ave. Dept. R Kansas City, Mo.

**Phosphorus Paste**

10 lbs., $4.25; 25 lbs., $9.
50 lbs., $17; 100 lbs., $32.50.

*For the extermination of rats and roaches.*

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***Please note, however, that you must request each booklet on a separate letterhead though they may all be mailed in one envelope addressed to Pests, 126 Lexington Avenue, New York City, N. Y.***

### GAS—HOT OR COLD?

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